LABORATORY APPARATUS AND REAGENTS

FISHER SCIENTIFIC CO.

LABORATORY APPARATUS AND REAGENTS

For

CHEMICAL, METALLURGICAL AND BIOLOGICAL LABORATORIES

1928

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FISHER SCIENTIFIC COMPANY

Formerly: SCIENTIFIC MATERIALS CO.

FACTORY, WAREHOUSE AND OFFICES

709-717 *Forbes Street, Pittsburgh, Pa.*

U. S. A.

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Formerly

SCIENTIFIC MATERIALS CO.

The Fisher Scientific Co. was founded in 1902 and incorporated in the state of Pennsylvania under the name of Scientific Materials Co. In 1925 the name of the company was changed to Fisher Scientific Co. The company's management is still in the hands of its founder.

The change of name to the Fisher Scientific Co. was in the name only and this was done to avoid confusion with the firms who have since adopted names of a general character and closely resembling our old name of Scientific Materials Co. The change was also made to denote the personal responsibility which has been back of this firm since 1902.

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Regarding This Catalogue

THIS catalogue is an entirely new and original book, which has been carefully compiled in a manner different from that which has prevailed in scientific apparatus trade. Instead of following precedent, this book has been compiled along new lines solely with the view of assisting the intelligent procurement of standardized and approved apparatus by mail.

In the laboratory apparatus trade, it has been the custom in the past, first in Europe, then in the United States and Canada, for each decade to preserve all of the articles inherited from the previous decade, and to add a few more. In this way a confusing array of apparatus, sizes and shapes had accumulated. Many of these articles were duplicates in utilitarian purposes, an unnecessarily large number of sizes had accumulated, many articles were obsolete and had not been discarded when the corresponding method had been discarded, and many more had long been superseded by other articles better suited for the intended purpose. Modern laboratory methods and practice required many other articles, which had not heretofore been offered.

THE FEATURES OF THIS CATALOGUE

Preferred Apparatus

This is a catalogue of preferred apparatus which we recommend to better meet the needs of modern laboratories, rather than a list of all of the apparatus with which we are familiar or can supply. It includes many pieces of new apparatus which we have designed and made especially to fulfill a purpose not previously provided for, or to better fulfill some particular need.

Before compiling the different sections of this catalogue, we considered the different approved methods of analysis and their requirements, and also consulted laboratories particularly interested. We made a critical examination of the merits and demerits of the many different types, shapes, and sizes of existing apparatus, and we also made a review of our own experience.

Standardization

The recent standardization work of the American Chemical Society Committee on Standard Apparatus, the American Society for Testing Materials, the American Bacteriological Society and the other organizations mentioned throughout this book, was examined item for item and their recommendations are reflected in the apparatus listed. The work of these organizations has been supplemented by our own standardization of detailed specifications.

As a result of this standardization work, the selection, procurement and duplication of approved apparatus is greatly facilitated. It also simplifies the satisfactory operation of the laboratory stock room.

Each Original Illustration

has been made from the standardized stock article that will be supplied, and each of these illustrations has been made with a view to show those details most important to the user.

Each Original Description

has been written to specifically describe our standardized stock article and to anticipate the pertinent questions which arise in the mind of the user. In doing this, we have avoided generalities, overstatements, and superlatives. With these descriptions we have given references to Technical Publications, Textbooks, and Standardized Methods where further information regarding the articles and their uses can be found.

Distinction

Each article in this catalogue, except those bearing the name of another manufacturer, whether made in our own shops or by others, is made according to our comprehensive specifications, and therefore, its catalogue number refers to a specific article which is distinct from other articles which might be referred to by the same general name, but which differ in detail and controlling specifications.

Each article is supplied with the guarantee that it will be in accord with its description given in this catalogue

THE MANUFACTURE OF LABORATORY APPARATUS

A large number of the articles listed in this catalogue are made in our own shops.

A VIEW IN ONE OF OUR INSTRUMENT SHOPS

Our Instrument Shops at Pittsburgh are equipped with modern machines, built especially for making the different apparatus of metal. The designs and specifications are first prepared by our chemists and engineers.

A VIEW IN OUR GLASS BLOWING SHOP

Our Glass Blowing Shops at Montreal and at Pittsburgh are equipped to make the glass articles, which are blown over the flame. Special articles are made to order according to specifications; repair work is also done. Our Engraving Shops do the calibrating, engraving and grinding.

The Basis on which Materials in this Catalogue are Supplied

Prices

The prices given in this catalogue were correct at the time the catalogue was compiled, but they are subject to the changing conditions and costs. Changes in prices of some few articles or groups are continually occurring, and those which prevail at the time the order is received will apply. On account of the size of this catalogue and the diversity of materials contained herein, it is impracticable to keep customers continually informed of each price change.

The prices in this catalogue are net and will serve as a guide. On the articles where quantity discounts are noted, these discounts are extended where the full quantity mentioned is ordered.

Packing and Cases

Except in a few instances, which are specifically mentioned in the catalogue, we make no extra charge to cover the cost of packing and cases for domestic shipments. This should be considered in judging values, because it is an item of considerable expense, and in the case of fragile glassware, bulky but inexpensive articles, and in small shipments, the cost of packing and cases amounts to a substantial percentage of the total price involved.

Export shipments require special packing and cases, and on such shipments we make an extra charge to cover the cost.

Terms

Shipments made from our United States house are f.o.b. Pittsburgh and those made from our Canadian house are f.o.b. Montreal.

Payment of bills is required within 30 days from the date of invoice of domestic shipments. We extend our usual 30-day terms to those accreditably rated by Dun's Mercantile Agency and to those who furnish satisfactory credit information; to facilitate the supplying of this information, we furnish credit information forms.

The payment for foreign shipments is made by draft with order or a banker's letter of credit payable on presentation of the invoice and shipping documents.

Claims

Our fair and considerate policy in handling all claims has been met by a similar policy on the part of our customers, with mutually satisfactory results.

In case of breakage or damage in a shipment of goods where it is evident from the packing or the case that the cause has been careless handling in transit, the transportation company will assume its liability, provided they are given the opportunity to examine the package in the condition received. It is only fair that they be given this opportunity.

We encourage the custom of advising us as to complaints, approval and suggestions. Such information is mutually beneficial.

Special Service

We have a Technical Service Department whose sole function is to keep in touch with the various laboratory practices and the uses of laboratory apparatus, and to apply this information for the betterment of our business. This technical service is extended free of charge to assist any of our customers in the selection of laboratory equipment to meet particular needs.

Every order when received is immediately put through the systematic routine through which it must pass in order to coordinate our organization and maintain our continuous stock records. When an unusually pressing need must be met and the order is so indicated, we make an exception and take it out of the routine, ship as quickly as possible and complete the routine records later.

Shipping

Where specific shipping instructions are lacking, we use our judgment, which we base on the nature of the material, distance to be sent, and the size and weight of the package.

The Interstate Commerce Commission has imposed special shipping regulations on different chemicals. These are more fully explained at the beginning of the Reagent List in the rear of this catalogue.

These regulations specifically provide for the manner in which many different chemicals must be shipped and we can comply with the shipping instructions on the order, only in so far as the I. C. C. regulations will permit.

TO FACILITATE THE USE OF THIS CATALOGUE

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According to

SECTIONS AND GENERAL GROUPS

The articles in this catalogue are arranged alphabetically with the exception of those which seemed more logical to group under the general heading of the purpose for which they are used, in which case these headings are in their natural alphabetical sequence. Chemical Reagents, Bacteriological Culture Media and Stains are in a separate list in the rear. Each item is indexed on pages 603 to 627 under all of the classifications that suggest themselves.

This Table of Contents gives the larger and more important sections and general groups and will facilitate the quick reference to them.

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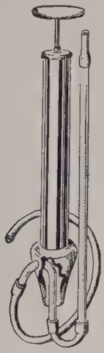
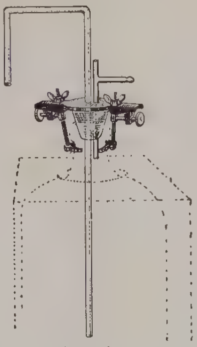


1-000



1-005

1-025

1-030

ABSORPTION BULBS, see Combustion Apparatus; Potash Bulbs; Tubes, Absorption.

1-000. ACID PUMP, Force Pump, for emptying acids and other liquids from carboys and large bottles, without lifting them off the ground. The pump consists of a nickel-plated, brass cylinder, 12 inches long and 1½ inches diameter, in which the piston-rod operates, and a hollow, cone-shaped, rubber stopper, to fit necks of bottles from 1¾ to 2½ inches inside diameter. The pump puts an air pressure on the surface of the liquid and forces it out through glass tube, without the liquid coming in contact with any metal. To stop the flow, pull the hollow rubber stopper out of the neck of the bottle.

The glass and rubber tubing connections are supplied. **Each, $12.25**

1-005. ACID PUMP, with Adjustable Clamps, for attaching pump securely to the neck of the carboy; used for drawing acids and other liquids, without tilting the carboy. The rubber stopper fits carboys with necks from 1½ to 2¼ inches inside diameter. The inlet tube for air and the delivery tube for the liquid are made of glass which permit the pump to be used with a great variety of liquids.

The flow is started, **first,** by holding a finger to close the air inlet tube and, **second,** by introducing pressure to the surface of the liquid, through the adjoining part of the T tube, by means of a bicycle pump, or Fletcher's Foot Blower. The liquid, thus started, continues to flow until stopped by removing the finger. **Each, $8.50**

1-010. GLASS PARTS, for No. 1-005 Acid Pump, consisting of glass inlet tube for air (T tube) and the long, glass delivery tube for the liquid. **Per set, $1.25**

1-015. RUBBER STOPPER, for No. 1-005 Acid Pump. **Each, $1.75**

1-020. METAL TOP, with Clamps, for No. 1-005 Acid Pump. **Each, $5.00**

ACID BOTTLES AND MEASURES, for Milk Testing, see Milk Testing Apparatus.

ACID JARS, of Stoneware, see Jars, Stoneware.

ACID PITCHERS, of Stoneware, see Pitchers, Stoneware.

1-025. ADAPTERS, Bent, made of lamp-blown glass, used for connecting condensers, retorts and other distilling apparatus with receivers. The inner angle is approximately 135°—sometimes called 45° from the perpendicular—which adapts itself for convenient use with the 75° angle of most distilling flasks, allowing unobstructed drainage of the distillate into the receiver. The total length is measured around the bend and the diameter of the large end is measured inside.

*Total length, mm	150	180	200
Diameter of large end, inside, mm	18	25	30
Each	**$ .18**	**.20**	**.25**

Per dozen, 10% discount.

1-030. ADAPTERS, Straight, made of lamp-blown glass. These adapters are used straight, or can be bent in the laboratory to any angle desired. The length corresponds to the total length of No. 1-025 Bent Adapters.

*Length, mm	150	180	200
Diameter of large end, inside, mm	18	25	30
Each	**$ .18**	**.20**	**.25**

Per dozen, 10% discount.

AGATE MORTARS, see Mortars, Agate.

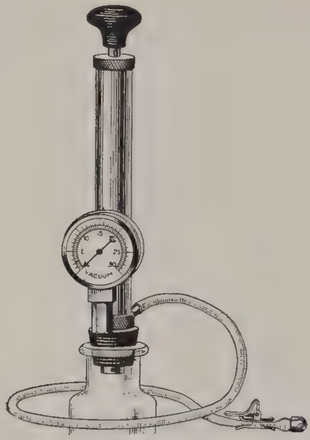
AIR ANALYSIS APPARATUS, see Gas Apparatus; Air Tester.

AIR BATHS, see Ovens.

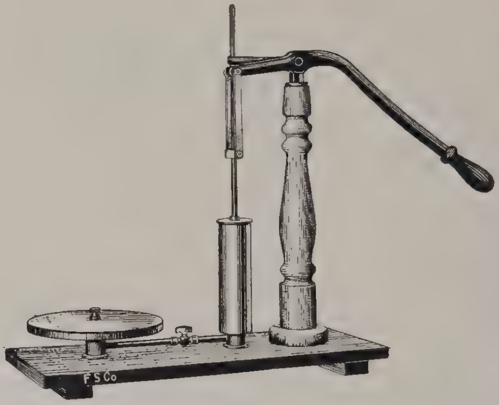
AIR PUMPS, for Blast, see Blast Apparatus.

AIR PUMPS, for Filtering, see Filter Pumps.

**Sizes adopted by the American Chemical Society, Standardization Committee.*



1–035



1–040

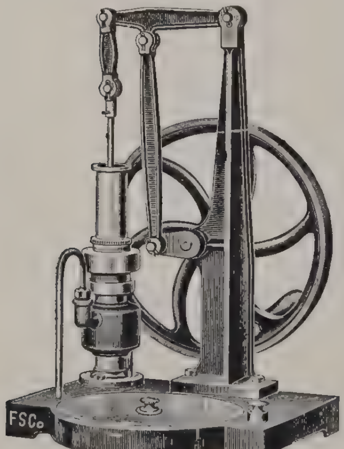
1-035. AIR PUMP, Vacuum, with Gauge, calibrated to read up to an equivalent of 30 inches of mercury. The pump is designed to take the place of a power pump, when the vessel to be exhausted is small. It is useful in starting the flow of liquids through a syphon hose, in which case the first of the liquid is caught in the bottle attached to the pump. For vacuum distillation and vacuum drying, the condensation collects in the bottle and cannot get into the pump or the gauge.

The vacuum is created in the bottle attached to the pump by pulling up the piston; a hose leads to the vessel to be evacuated. As the pumping increases, the vacuum is registered on the gauge. If the rubber stopper is fitted tightly into the neck of the bottle and the other connections are also tight, the vacuum is maintained with very little leakage, and can be held for hours. A few additional strokes of the pump will enable an exact amount of vacuum to be maintained over a long period.

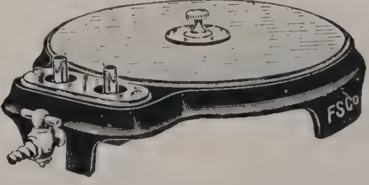
The pump is made of brass, nickel-plated, and measures, over all, about 10 inches, without the bottle. The rubber stopper fits necks of bottles one-inch inside diameter. The outfit consists of the pump, with gauge; 8-ounce glass bottle; and hose two feet long, with metal end and pinchcock. **Each, $10.00**

1-040. AIR PUMP, EVACUATING APPARATUS, Lever Action, for evacuating bell jars and other vessels. The pump-plate, with hole in center, on which the vessel to be evacuated rests, is made of cast steel, 9 inches diameter and ground plane to make an air-tight connection with the ground rim of the bell jar. A guard-plug screws into the hole to keep out foreign matter, when the outfit is not in use. The cylinder of the pump is nickel-plated, 2¼ inches in diameter and has a 6½-inch stroke. A stopcock valve between the cylinder and the pump-plate shuts off the vessel from the pump, after the desired vacuum has been reached. The whole outfit is mounted on a polished hardwood base 9½ x 24 inches. **Each, $38.00**

1-045. AIR PUMP, EVACUATING APPARATUS, Oil Sealed, Geryk Design. Operated by hand or power, with wheel grooved for a 5/16 inch round belt. This is a substantial outfit, made of cast iron and brass and capable of producing a vacuum of 0.15 mm. of mercury. The piston is 1⅞ inches in diameter and has a 3½-inch stroke. The pump-plate is of thick plate glass, 10 inches diameter, ground plane and cemented in the iron base. The air outlet located in the center of the pump-plate is fitted with a safety plug to prevent liquids from entering the pump. An opening at the side of the base is provided for attaching a gauge, if desired. The piston works in oil, which follows and seals the inlets and outlets, making leakage impossible. **Each, $70.00**

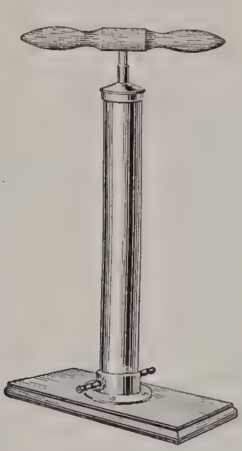


1–045

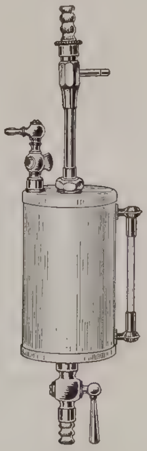


1–050

1-050. AIR PUMP PLATE, adapted for exhausting Bell Glasses and other vessels in connection with a Vacuum Pump. Made of heavy plate glass, 10 inches diameter, ground plane and firmly cemented upon a low cast iron base; provided with brass stopcock and brass connecting tube, with oil sealed taps for inlet of air and for manometer. The vent hole in center is tapped (7/16-16) for air pump accessories and fitted with a guard plug. **Each, $22.00**



1-055

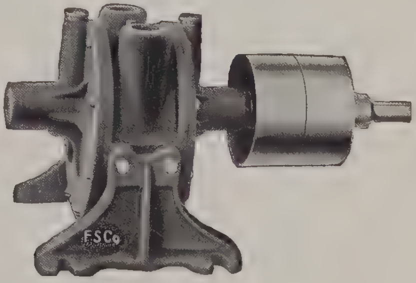


1-060

1-055. AIR PUMP, Pressure or Vacuum, operated by hand and suitable for elementary work where moderate pressure or vacuum is desired. The cylinder is of brass, nickel-plated and 2⅛ inches in diameter. When the piston is forced down, the height over all is 21½ inches. This pump is well constructed with large handle, convenient for grasping with both hands at the same time, and with hard wood base 4½x12 inches, which can be held firmly by the feet, or screwed to the floor. **Each, $13.50**

1-060. AIR PUMP, Pressure or Vacuum, Muencke—Water Power, consisting of a heavy brass filter pump, 5⅜ inches long, attached to a zinc reservoir 4 inches in diameter and 8 inches high, with water gauge, nickel-plated fittings and metal bands for fastening the whole to the wall. With a water pressure of 30 pounds, sufficient air pressure can be developed to operate two laboratory blast burners. The air can be regulated by means of the stopcocks. This device can also be used as a vacuum pump. Arranged for connection to water supply by rubber tubing. **Each, $18.00**

1-065
Sizes 1-A and 2-A

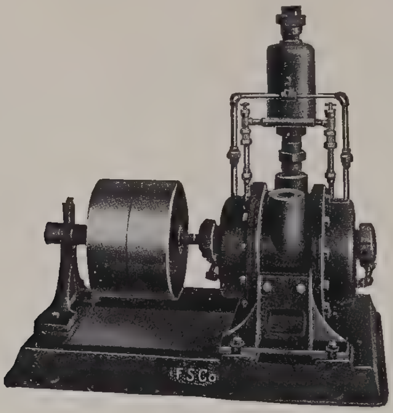


1-065
Sizes 3-A and 4-A

1-065. AIR PUMP (Blower), Crowell Rotary Type A, producing Pressures from 1 to 10 pounds per sq. in., or any degree of Vacuum not exceeding 24 inches. The principle of construction is an internal drum and shaft carrying sliding blades which operate in close contact with the cylinder wall, with no springs, gears, valves or unbalanced parts. Pressure is not dependent upon high speeds or centrifugal force. When used with Receiver No. 1-085, a continuous supply of air can be had at a definite pressure.

Size No.	Cu. in. free air per revolution.	Cu. ft. free air per min. max. speed.	R.P.M. max. speed.	H.P. approx. at 3-lb. pressure.	Pulleys, inches.	Net weight, pounds.	Pipe size, inches, inlet and outlet.	Floor space, inches.	Each
1-A	20	6.9	600	⅛	4x1	24	½	10 x 6¼	**$28.00**
2-A	45	13.0	500	¼	4x1½	34	¾	12½x 6½	**36.00**
3-A	125	25.3	350	½	6x2½	90	1	22 x14	**58.00**
4-A	280	40.5	250	1	9x3	170	1½	28 x17	**75.00**

Air Pumps



1-070

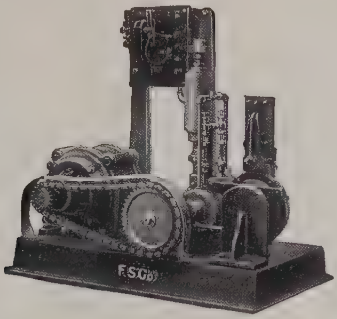
1-070. AIR PUMP (Blower), Crowell Rotary Type D, built for **heavy duty,** producing pressures up to 25 pounds per sq. in. or vacuum from 29 to 30 inches of mercury, under permissible atmospheric conditions. The principle of construction is the same as No. 1-065 Air Pump, but of heavier construction; with water cooled head and automatically controlled system of lubrication. The oil feed valves are adjustable, to suit the grade of oil used, and can be closed entirely when necessary. The pump rotates in one direction only when used either for Pressure or Vacuum and requires no change in the lubricating system in changing from one to the other. When used with Receiver No. 1-085, a continuous supply of air can be had at a definite pressure.

Size No.	Cu. in. free air per revolution.	Cu. ft. free air per min. at max. speed.	R.P.M. max. speed.	Approx. H.P. at 15-lb. pressure or 29-in. vacuum.	Pulleys tight and loose, in.	Approx. net weight, lb.	Pipe size, inches, inlet and outlet.	Floor space inches.	Each
1-D	15	4.3	500	¾	6x2	70	½	13x18	**$78.00**
2-D	40	9.2	400	1	8x2	115	¾	14x22	**95.00**
3-D	100	17.0	300	2	12x4	250	1	19x34	**125.00**

1-075

1-075. AIR PUMP (Blower), Crowell Rotary Type D—Motor Driven, the same style as No. 1-070 Air Pump, mounted on a special metal bed-plate, with Motor 110 volts, 60 cycle A.C., connected by silent chain drive. For details of pump, see No. 1-070. This is the complete equipment required for generating air pressure, or vacuum for an entire laboratory building. Motors for other currents can be supplied.

Size No.	1-DM	2-DM	3-DM
Motor, h.p.	¾	1	2
Each	**$250.00**	**275.00**	**365.00**

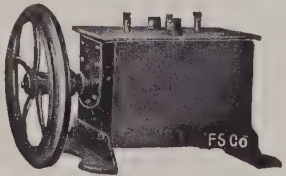


1-080

1-080. AIR PUMP, (Blower) Crowell Rotary Type D—Motor Driven, Automatically Controlled, same style as No. 1-075 Air Pump fitted with a Cutler-Hammer **Self Starter** and **Diaphragm Control** so that the pump will start or stop automatically at the desired pressure or vacuum, at which the Regulator is set. At the price below, we supply the regulator either for pressure or vacuum. It can be mounted on the bed-plate, as shown in the illustration, at an extra cost. To use the pump alternately for pressure and vacuum, the regulator must be disconnected. Motors for 110 volt A. C. are supplied, unless otherwise specified.

Size No.	1-DH	2-DH	3-DH
Each	**$300.00**	**325.00**	**415.00**

1-085



1-090

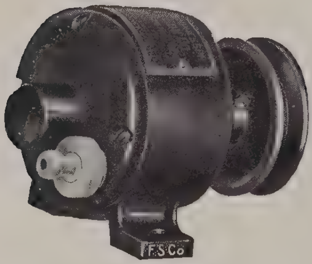
1-085. AIR RECEIVER, with Relief Valve, for close regulation of pressure when using Air Pumps Nos. 1-065, 1-070, 1-075 and 1-080. The Relief Valve can be set to blow off at any pressure from 1 to 10 pounds per square inch. When used with an air pump, this reservoir provides a means of obtaining a steady and uniform supply of compressed air.

Size No.	Dimensions, inches.	Net weight, pounds.	Pipe size, inches, inlet and outlet.	Capacity, gallons.	**Each**
1	12x 8	15	½	2.6	**$13.00**
2	12x 8	15	¾	2.6	**13.00**
3	18x10	28	1	6.0	**15.50**
4	20x10	32	1½	6.8	**17.50**

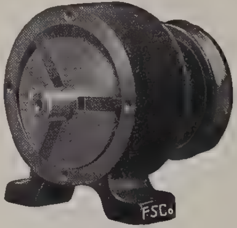
1-090. AIR PUMP, Crowell Rotary Type O-D, in Oil Immersion Box, designed for intermittent operation and **principally for vacuum work,** but can also be used for pressure. The oil immersion box makes it practically leak-proof. The pump will exhaust to a vacuum of 29 to 30 inches, or produce a pressure up to 25 pounds per square inch; capacity about 2 cu. ft. of free air per minute; inlet and outlet tapped for ½-inch pipe; motor required, ¼ h.p. with speed of 600 r.p.m.; weight, 50 pounds; floor space, 15x8 inches.

Each, $66.00

Air Pumps



1-095 1-100



Interior of Vernon Pumps

1-105

1-095. AIR PUMP, Vernon Rotary No. 1, Pressure or Vacuum, constructed on the principle of sliding vanes coming in contact with the cylinder wall of the pump, by centrifugal force. This pump is **popular as a small blower** and will produce enough pressure to operate one laboratory Blast Burner. A regulating device adjusts the pressure, without reducing the speed of the motor. The vacuum on the intake side is in exact ratio to the pressure on the compression side and, **as a Vacuum Pump,** a vacuum up to 9 inches of mercury can be obtained.

At 3000 Revolutions per Minute, it will produce pressure up to 5 pounds. The Pump weighs 2¼ pounds, has ⅛-inch inlet and outlet for air, has a grooved pulley and requires ⅛ h.p. motor for operating. **Each, $11.00**

1-100. AIR PUMP, Vernon Rotary No. 2, similar to No. 1-095, but of greater capacity, sufficient for operating two or three laboratory Blast Burners. A vacuum of 16 inches of mercury can be obtained.

At 2500 Revolutions per Minute, it will produce pressures up to 9½ pounds. The Pump weighs 4 pounds, has ¼-inch inlet and outlet for air, has a grooved pulley and requires ¼ h.p. motor for operating. **Each, $17.50**

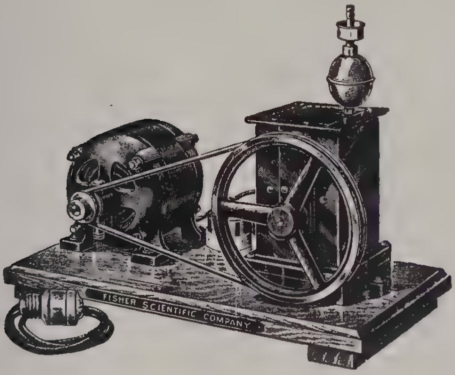
1-105. AIR PUMP, Vernon Rotary No. 3, similar to Nos. 1-095 and 1-100, but still larger; sufficient to operate four or five laboratory Blast Burners. A vacuum of 17 inches of mercury can be obtained.

At 1500 Revolutions per Minute, it will produce pressures up to 30 pounds. The Pump weighs 10 pounds, has ⅜-inch inlet and outlet for air, has a 3½-inch by 1-inch pulley and requires ¼ h.p. motor for operating. **Each, $19.50**

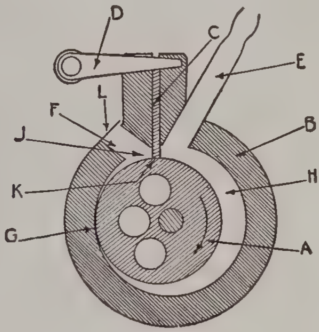
IN THE UNITED STATES
709-719 Forbes St. Pittsburgh, Pa.

IN CANADA
204-206 McGill St., Montreal

BOTH HOUSES DEVOTED EXCLUSIVELY TO LABORATORY SUPPLIES



1-110
See also No. 1-115



Cross-section of rotors in Air Pump No. 1-110

1-110. AIR PUMP, Hyvac Double Stage, Rotary, a self-contained high vacuum pump producing a vacuum of 0.001 mm., without the aid of a preliminary or backing pump. This improved design does not have vanes, thrown against the cylinder by centrifugal force, but has two rotors "A" mounted rigidly on the same shaft which revolve eccentrically in cylinder "B." The movable vane "C" is in the stationary part and seals the Intake "E," at point "K," from the Outlet "F." The pump is also sealed at point "G" by the rotor. The valve "L," at the outlet, cuts off the back pressure of the atmosphere and reduces the power required for operation. An automatic trap at the Inlet prevents "sucking back" of any oil into the exhausted vessel, should the pump be stopped. The entire pump is immersed in a special oil which seals and prevents leakage. The oil also distributes any heat generated, and avoids displacement of any parts due to expansion.

The inlet tube ends in a hose connection, for the convenient attachment of heavy rubber tubing. An annular seal is provided upon the inlet tube, which enables the operator, by means of De Khotinsky Cement or Wood's Metal, to attach a glass tube quickly and tightly to the pump and, with equal ease, to remove it.

This pump is a new application of the very old mechanical principle in pump construction, viz., that of a solid cylinder, mounted on a shaft, designed to rotate eccentrically within a larger hollow cylinder. By its refinements, the Hyvac Pump eliminates many of the annoying features of other mechanical pumps and, at the same time, produces a vacuum of 0.001, or more, without the use of a preliminary or "backing" pump. The reason for this is that the two rotors constitute a two-stage, self contained pump, the one acting as a "backing" pump and the other as a finishing pump.

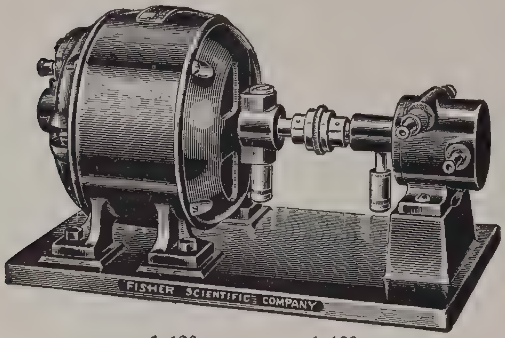
SPECIFICATIONS

Degree of vacuum, mm	0.001
Capacity, free air per minute, cu. in	415
Size of Pump, inches	4½x4½x8
Size of wooden base, inches	9x18
Power required, h.p.	1/10
Proper speed, r.p.m	240
Pulley, diam. inches	7
Weight of Pump, lbs	16½
Oil required, ozs	21

Mounted on Hardwood Base, with 110 Volt A.C. **Motor** and **Belt.** **Each, $90.00**
(Motors of other specifications are supplied on request.)

1-115. AIR PUMP, Hyvac Double Stage, Rotary. The Air Pump described under No. 1-110, **unmounted** and **without motor.** **Each, $50.00**

Air Pumps



1-120 **1-130**
See also No. 1-125 and No. 1-135

1-120. AIR PUMP, Rotary Blower and Vacuum Pump, designed for operating Blast Burners, for Drying and other laboratory purposes requiring moderate air pressure or vacuum, such as vacuum filtration, moving gases through apparatus, etc.

Used as a Blower, it will produce a Pressure of 7 pounds per sq. in. at 1725 r.p.m. and has a capacity of 0.75 cu. ft. of air per minute. It will operate two ordinary Blast Lamps and has a power consumption of 66 watts. A valve on the outlet tube permits variation of the air pressure. The Blower is surrounded by a water jacket.

Used as a Vacuum Pump, it will produce a Vacuum up to 16 inches of mercury and is a simple and compact Vacuum Pump for work within this range. A Valve permits variation in the degree of vacuum. Mounted on a cast iron base, 5x9½ inches, directly connected to a $\frac{1}{20}$ h.p. Motor for 110 Volts A.C. **Each, $48.00**

(Motors of other specifications are supplied upon request.)

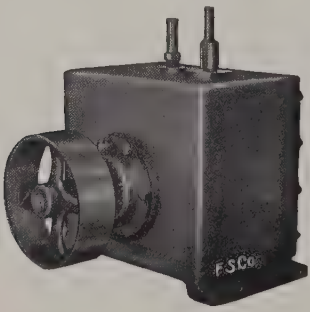
1-125. AIR PUMP, Rotary Blower and Vacuum Pump, similar to 1-120, but **without Base and Motor,** supplied with grooved pulley. **Each, $15.00**

1-130. AIR PUMP, Rotary Blower and Vacuum Pump, similar to No. 1-120, but capable of producing Pressure up to **10 pounds** per sq. in. at 1725 r.p.m. and having a capacity of 1.4 cu. ft. of air per minute. It will operate four ordinary Blast Lamps, and has a power consumption of 175 watts.

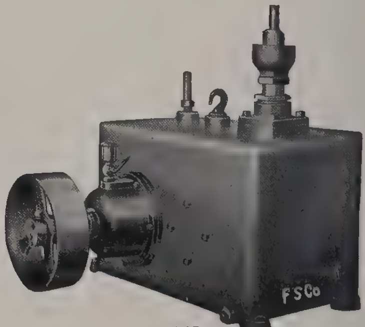
As a Vacuum Pump, it will produce a Vacuum up to 18 inches of mercury.

Mounted on a cast iron base 7¾x13 inches, directly connected to a ⅛ h.p. Motor for 110 volts A.C. (Motors of other specifications supplied upon request.) **Each, $63.00**

1-135. AIR PUMP, Rotary Blower and Vacuum Pump, similar to No. 1-130, but **without Base and Motor,** supplied with grooved pulley. **Each, $18.50**



1-140



1-145

1-140. AIR PUMP, Vacuum, Power Driven, American Model No. 1, with a capacity of 5 cubic feet of free air per minute and capable of reducing the pressure to 0.02 inch (0.5 mm.) of mercury in 7 minutes, when exhausting a volume of 7 gallons (one cubic foot).

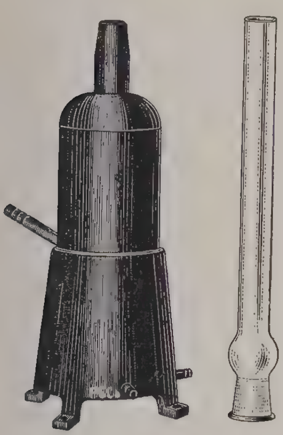
The pump consists of a rotating piston, with steel blades, in an elliptically shaped case, which is immersed in oil and inclosed in an air-tight iron case. The driving shaft has two stuffing boxes, which are oil sealed. The pump requires no attention when in operation, is not affected by chemically active gases, and is not injured if the vacuum is suddenly broken. Model No. 1 is used for general laboratory work, with electric vacuum furnaces, vacuum driers, and for lecture or demonstration purposes. It is specially designed as a preliminary or auxiliary pump for High Vacuum Pump No. 1-145.

The air-tight iron case measures 16x14½x15½ inches high, weighs 113 pounds, requires 7 quarts of vacuum pump oil and operates at 250 r.p.m. with a ½ h.p. motor. It takes a 2-inch belt. **Each, $125.00**

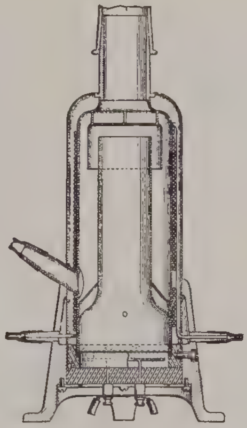
1-145. AIR PUMP, High Vacuum, Power Driven, American Model No. 2, with a capacity of 4 cubic feet of free air per minute and capable of reducing the pressure (vessel having been previously put on a preliminary pump, such as No. 1-140) to 0.00001 mm. of mercury in 12 minutes, when exhausting a volume of 3 gallons (0.401 cubic foot).

The pump is immersed in oil in an air-tight iron case, the driving shaft being provided with an oil-sealed bearing to prevent air entering the case. Because of its freedom from corrosion, this pump can be used in connection with large vessels or with vessels in which large quantities of gases are liberated, as, for example, by hot metals. The chemically active gases do not affect this pump, and it is not injured if the vacuum is suddenly broken. This pump is designed to evacuate nitrogen lamp bulbs, vapor lamps, mercury arc rectifiers, thermos bottles and X-ray tubes.

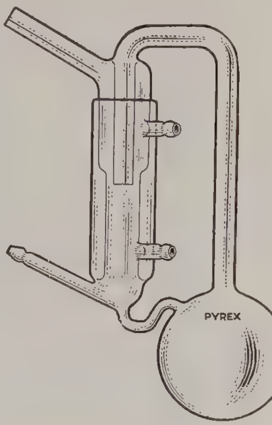
The air-tight iron case measures 19x18½x16 inches high, weighs 175 pounds, requires 11 quarts of vacuum pump oil and operates at 250 r.p.m. with a ¼ h.p. motor. It takes a 2-inch belt. **Each, $230.00**



1-150



Cross-section, No. 1-150



1-155

1-150. AIR PUMP, Very High Vacuum, Langmuir, Mercury-Condensation, made **entirely of metal,** with outstanding characteristics of speed and ability to produce the highest degree of vacuum. When connected with tubing large enough to allow efficient operation, this pump works at the rate of 3000 to 4000 ml. per second, producing pressures as low as 10 to the minus 4th power, bars. (*One bar is equal to the pressure of 0.00075 mm. of mercury or about one-millionth of an atmosphere.*) In theory, the limit to which pressure can be reduced, is zero. In actual practice this is never obtainable due to the continuous liberation of gas from the walls of the apparatus.

The degree of vacuum produced by this pump is the nearest to theoretical zero so far obtained. The exceedingly high degree of vacuum obtainable with this pump will recommend it to the research man and laboratory worker. It is also well adapted to commercial uses.

The Langmuir Mercury-Condensation Pump contains no moving parts, but depends simply upon a blast of mercury which pushes the gas, which is being removed, into a condenser where the mercury is condensed for re-use and from which the gas is carried to the atmosphere by means of an auxiliary or "backing" pump. For thoroughly satisfactory operation, an auxiliary pump capable of producing a vacuum of at least 0.1 mm. of mercury must be used in series with the mercury-condensation pump. Care should be taken that no mercury vapor be allowed to enter the auxiliary pump, because the brass and babbitt parts will be attacked. To prevent this, a glass mercury trap (not furnished with the pump), filled with broken glass to increase the condensing surface, should be inserted between the two pumps.

For a thorough consideration of the theory of the pump, we refer to an article by the inventor, Dr. Irving Langmuir, entitled "The Condensation Pump; an Improved Form of High Vacuum Pump" published in the *General Electric Review*, December, 1916. See, also, the series of articles by Dr. Saul Dushman entitled "The Production and Measurement of High Vacua" published in the *General Electric Review* beginning June, 1920. Special reference is made to the Langmuir Condensation Pump in the August issue. The whole series is published in book form by the *General Electric Review.*

The unit is supplied with 626 grams of mercury, which is enough to operate the pump; an electric heater for 110-volt A.C., for vaporizing the mercury; a glass connecting-tube, 15 inches long, ground to fit the pump, for connecting the pump to the vessel to be exhausted, and a small can of vacuum-grease.

Each, $120.00

1-155. AIR PUMP, Very High Vacuum, Langmuir, Mercury-Condensation, PYREX Glass, built on the same principle as the all-metal design. (*See No. 1-150 for discussion and references.*) This glass condensation pump can produce pressures of 0.000002 mm. of mercury and lower, when operated in connection with an "oil-sealed" auxiliary or backing pump of the mechanical type, capable of producing pressures of at least 0.1 mm. of mercury. The glass pump requires 680 grams of mercury.

The glass design is cheaper than the all-metal one and well adapted for use in the educational or experimental laboratory where great speed is not a requirement. Laboratories of Physics and Chemistry in Colleges and Universities, as well as Research Laboratories, will find the PYREX glass mercury-condensation pump a very satisfactory and economical means of obtaining the highest degree of vacuum, limited only by the evolution of gas from the walls of the vessel being evacuated.

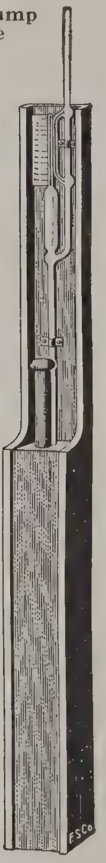
Under this caption, the PYREX glass mercury-condensation pump alone is supplied. When put in operation, it should be heated (See No. 1-160 for heater) and properly insulated with asbestos. Mercury is not furnished with the pump. **Glass pump, alone, $57.00**

1-160. ELECTRIC HEATER, for No. 1-155 Air Pump, consisting of a heating unit for 110 volts A.C. or D.C., mounted in a copper beaker. The heater consumes 300 watts. **Heater, without rheostat, $17.00**

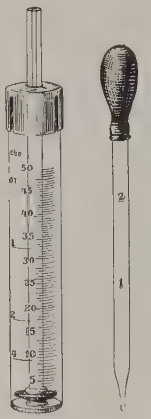
1-165. MERCURY, for No. 1-155 Air Pump, supplied in lots of 50 ml. (680 grams) which is sufficient to operate pump. To obtain the proper results, all mercury must be pure and kept very clean.

Price upon application, because of the fluctuation of the mercury market.

Air Pump Gauge



1-170



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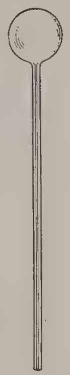

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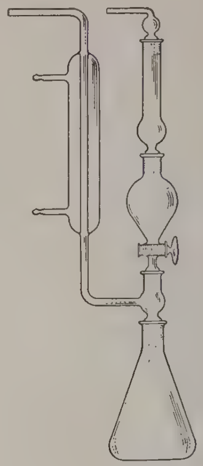
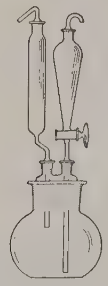
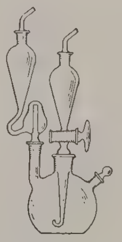


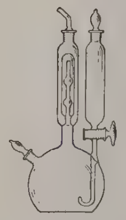
1-195



1-200



1-205



1-210

1-170. **AIR PUMP GAUGE, McLeod, High Vacuum,** for measuring very high vacua. This device measures low gas pressures in a vacuum system, by trapping a known volume of gas, at the pressure of the system, and compressing this gas to a smaller known volume, under a measurable pressure. From these three known factors, the unknown pressure is obtained.

The McLeod Vacuum Gauge is a practical and scientifically accurate instrument for measuring vacua from 200 microns to 0.5 micron (0.20 to 0.0005 mm.). The scale is calibrated directly in microns, so that mathematical calculations are unnecessary. The millimeter reading can be easily computed by using the factor marked on the scale.

The capacity of the glass bulb is 500 ml.; 750 ml. (5½ lbs.) of mercury are required to operate the gauge. The glass parts are attached to a finely finished wooden support and are protected to reduce the risk of breakage. The gauge is easily operated and the results are reliable and quickly obtained.

Gauge, without mercury, $60.00

1-175. **MERCURY, for McLeod Vacuum Gauge,** price on application, because of the fluctuation of the market.

1-180. **AIR TESTER, Wolpert-Carbacidometer,** for determining the amount of carbonic acid gas (CO_2) in the air. This is accomplished by direct readings on a graduated glass tube and does away with all computations and tables as used in the older forms of air testers.

The operation is simple, consisting of mixing the reagents (chemicals included with each tester), introducing the proper amount of solution into the graduated glass tube and withdrawing the plunger, thereby allowing more air to be mixed with the solution, until, after frequent shaking, the liquid becomes colorless. Full directions and reagents are included. **Each, $4.50**

1-185. **REAGENTS, for Wolpert Air Tester,** No. 1-180; consisting of six capsules each, of sodium carbonate and phenolphthalein. **Per set, $1.00**

1-190. **AIR THERMOMETER TUBE,** of glass, diameter of bulb 50 mm.; length of capillary stem 300 mm.; used to demonstrate expansion caused by heat. **Each, $ .35**

ALBUMINOMETERS, see Clinical Diagnostic Apparatus.

ALCOHOL LAMPS, see Burners.

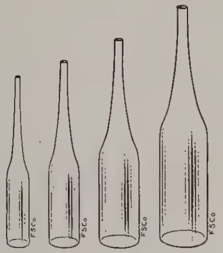
ALCOHOLOMETERS, see Hydrometers, Alcohol; Balances, Specific Gravity; also Ebulliometer.

1-195. **ALKALIMETER, Carbon Dioxide (CO_2) Apparatus, Knorr, with ground joints,** for the determination of CO_2 in inorganic carbonates; particularly adapted for Baking Powder and recommended by the Association of Official Agricultural Chemists. Height over all about 17½ inches. **Each, $10.00**

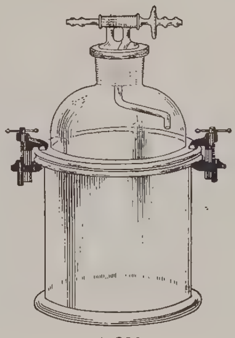
1-200. **ALKALIMETER, Carbon Dioxide (CO_2) Apparatus, Mohr, New Model** with all joints ground. Height over all approximately 10½ inches. **Each, $6.00**

1-205. **ALKALIMETER, Carbon Dioxide (CO_2) Apparatus, Geissler, Improved Form,** with all joints ground. Height approximately 8½ inches. **Each, $6.50**

1-210. **ALKALIMETER, Carbon Dioxide (CO_2) Apparatus, Schroedter, with tube in flask,** all joints ground. Height approximately 6½ inches. **Each, $5.50**



1-215



1-220

ALUNDUM "RR," see Combustion Boat Lining.
ALUNDUM BOATS, see Combustion Boats.
ALUNDUM CRUCIBLES, see Crucibles.
AMMONIA APPARATUS, Folin's, see Clinical Diagnostic Apparatus.
AMMETERS, see Electrical Apparatus.

1-215. AMPOULES, Clear Resistant Glass, standard shape, flat bottom, long tips with open ends, suitable for sealing.

Capacity, approx., ml.	1	2	5	10
Per dozen	**$ .35**	**.35**	**.65**	**.85**
Per gross	**$2.75**	**2.75**	**6.00**	**7.50**

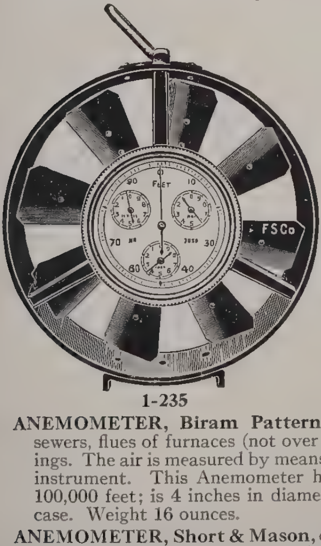
AMPOULES, Bottle Form, see Bottles, Serum.

1-220. ANAEROBIC CULTURE APPARATUS, Novy Culture Jar, with stopcock on top of the ground-in glass stopper; used for plate cultures of anaerobic bacteria, by the vacuum, gas or pyrogallic methods. By making the stopcock on top of the stopper, much of the pressure, which in older designs concentrated here, is relieved from this, the weakest point. To permit the use of Petri Dishes, the apparatus is divided and an air-tight joint is made by means of a rubber ring, or gasket, fitted between the ground rims of the upper and lower chambers, which are held together by two metal clamps. The lower chamber is 150 mm. high and 140 mm. diameter. Although this apparatus is made of heavy glass, it is **not intended for high vacuum work,** but should be used with a filter pump, or other vacuum pump, producing a vacuum of not more than 15 inches of mercury. (For method, see *Journal of Applied Microscopy, Vol. II, No. 2.*) **Each, $12.00**

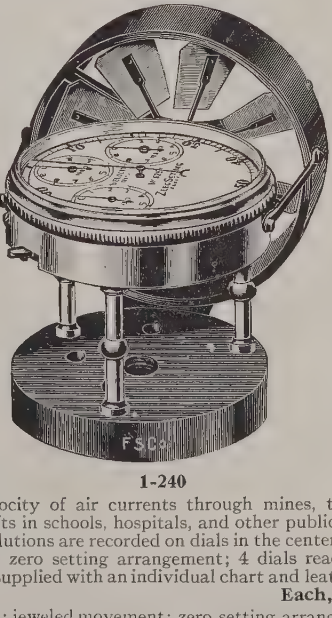
1-225. RUBBER RINGS (Gaskets), for No. 1-220 Anaerobic Culture Apparatus. Each, $ .30

1-230. IRON CLAMPS, for No. 1-220 Anaerobic Culture Apparatus. Each, $1.25

ANATOMICAL JARS, see Jars, Museum.



1-235

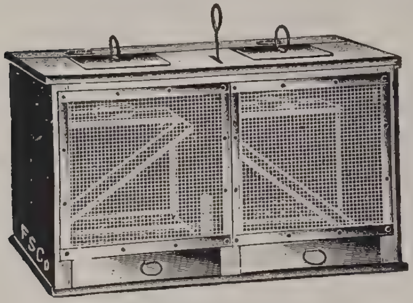


1-240

1-235. ANEMOMETER, Biram Pattern, for registering the velocity of air currents through mines, tunnels, sewers, flues of furnaces (not over 300° F.), ventilation shafts in schools, hospitals, and other public buildings. The air is measured by means of a light fan whose revolutions are recorded on dials in the center of the instrument. This Anemometer has a jeweled movement; zero setting arrangement; 4 dials reading to 100,000 feet; is 4 inches in diameter. Each instrument is supplied with an individual chart and leatherette case. Weight 16 ounces. **Each, $45.00**

1-240. ANEMOMETER, Short & Mason, of **British Manufacture**; jeweled movement; zero setting arrangement; 4 dials reading to 100,000 feet; 2½ inches diameter; stands 3 inches high; weighs 8½ ounces and is supplied with a leather case. **Each, $54.00**

ANIMAL CAGES AND HOLDERS



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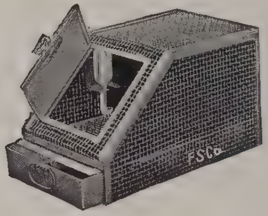
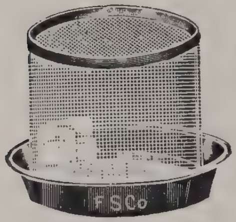


1-250

1-245. ANIMAL BREEDING CAGE, Heim, for breeding mice and other small rodents; made of well finished oak, lined with galvanized iron; with removable drawers for cleaning. The cage is made in two compartments, with a sliding door between, the animals being put in from the top. Each side is provided with a removable shelf for food and a run-way of metal cloth. Outside dimensions, 20 inches wide, 12 inches high, and 12 inches deep. **Each, $27.00**

1-250. ANIMAL CAGE, Army Medical School Model, for Rats, of galvanized ingot iron and galvanized iron cloth, with removable drawer for cleaning. A hinged door is regularly supplied, but a sliding door may be had by those who prefer this when handling wild rats with tongs. Size, 9 inches wide, 9 inches high, and 15 inches deep. Furnished without Drinking Tube. **Each, $5.00**

1-255. DRINKING TUBE, of glass, for use with No. 1-250 Animal Cage. **Each, $ .75**



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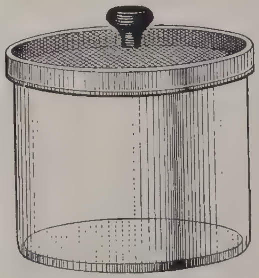


1-265
See also No. 1-270

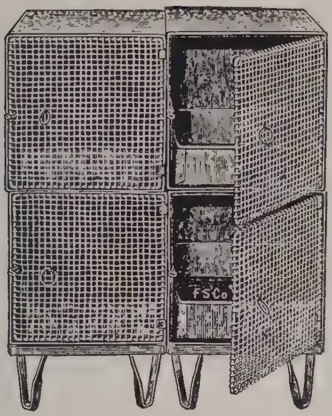
1-260. ANIMAL CAGE, Osborn Round Form, for mice, rats and other small animals under observation in feeding experiments; made of galvanized iron wire, with open bottom resting in an enameled pan 2 inches deep and upon two loose wire mats. Supplied with two opal glass drinking cups with holders. Height of wire cage 8 inches, diameter 9 inches. **Each, $5.00**

1-265. ANIMAL CAGES (Animal Jars), for mice, rats, guinea pigs and other small animals. The jars are made of heavy glass, and are supplied with weighted covers of metal, having a wire mesh top, and heavy knob handle.

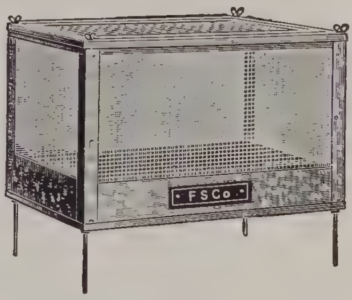
Diameter of jar, inches	7	9	12
Height of jar, inches	6	8	11
Capacity, gallons	1	2	5
Each	**$4.00**	**5.50**	**10.00**

1-270. GLASS JARS, without covers. For No. 1-265 Cages.

Diameter, inches	7	9	12
Height, inches	6	8	11
Capacity, gallons	1	2	5
Each	**$2.20**	**3.30**	**7.50**



1-275 1-280

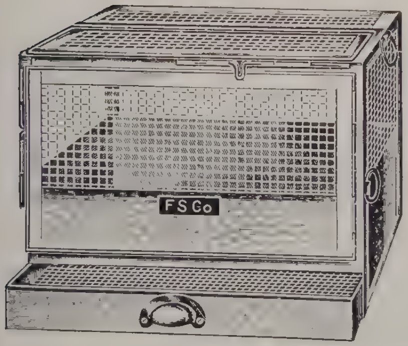


1-285

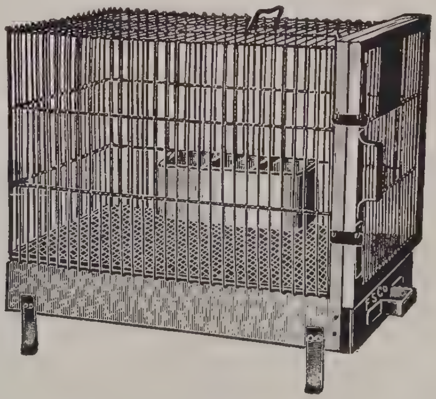
1-275. ANIMAL CAGE, Phipps Institute Type, for all kinds of small animals; manufactured of galvanized sheet iron, closed all around, except the door, which is made of strong wire mesh, with spring wire catch. This style of cage has proven one of the most popular, especially in laboratories with a limited amount of floor space, because a number of units may be bolted together (illustration shows four units on two stands No. 1-280) and stacked as high as desired. Each unit is 14 inches wide, 14 inches high and 16 inches deep, and is provided with a removable pan for cleaning. **Per unit, without stand, $8.00**

1-280. ANIMAL CAGE STAND, for Animal Cage No. 1-275; made of galvanized iron, 14 inches wide, 16 inches deep; raises the cage 6¾ inches from the floor. **Each, $3.00**

1-285. ANIMAL CAGE, Vaughan Collapsible, for inoculated rabbits, guinea pigs, etc.; made of galvanized iron and strong galvanized wire cloth. The collapsible feature makes this style of cage convenient for sterilization and storage. The top, bottom, and sides are separate pieces held together by four thumb-screws at the top of the cage. The legs are 5 inches high and the cage, without the legs, is 20 inches wide, 12 inches high and 15 inches deep. **Each, $12.00**



1-290



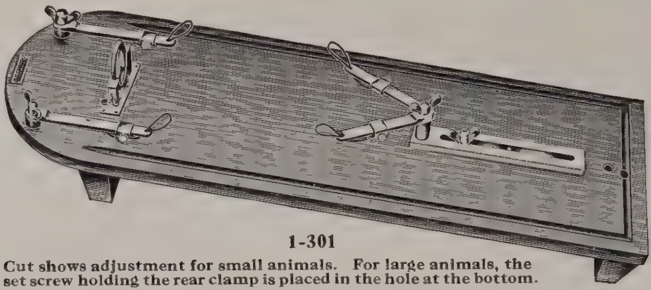
1-295

1-290. ANIMAL CAGE, Yale Model—Removable Drawer, for Rabbits and other small animals; made of galvanized sheet iron and galvanized wire, ½-inch mesh, with a door in front and one on top, and two zinc feed cups in zinc holder. Size: 18 inches wide, 13½ inches high and 18 inches deep. **Each, $12.00**

1-295. ANIMAL CAGE, for Small Dogs, of extra heavy wire with front and door of angle steel; inside floor and drawer are removable for cleaning.

Size No.	1	2	3	4
Length, inches	12	16	20	24
Width, inches	12	14	16	18
Height, inches	16	18	20	22
Each	**$28.50**	**32.25**	**37.00**	**43.00**

Animal Holders



1-301

Cut shows adjustment for small animals. For large animals, the set screw holding the rear clamp is placed in the hole at the bottom.

1-301. ANIMAL HOLDER, Huddleson Operating Board. Designed by Dr. I. Forest Huddleson, Michigan State College, after using the different boards available.

The Huddleson Board provides the method of complete restraint of the animal and does so without injury to the animal.

Its flexibility makes the Huddleson Animal Board applicable, regardless of the size of the animal subject to experiment. With the arms extended, the distance between the cords which hold the fore and rear extremities is 48″ and, using the smallest adjustment possible, this distance is reduced to three inches. All intermediate adjustments may be readily attained. From this it will be seen that the board will accommodate rabbits, guinea pigs, rats, cats or small dogs.

The single adjustable clamp for the head, with set screw to hold it in position, adds to the flexibility, and makes it adaptable to large and small animals alike.

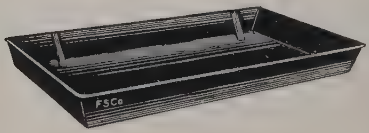
The adjustable loops which hold the limbs are made of strong, pliable cord and preclude the possibility f injuring the limbs while placing or holding the subject in position.

Simplicity and ease of operation are also features of the board. All adjustments can be operated from the side facing the technician. These are easily accessible and remain rigid after adjustment has been made.

A moat around the edge of the board slopes to the outlet at the foot, thereby providing drainage.

Each, $40.00

1-310



1-315

1-310. ANIMAL HOLDERS, Dissecting Boards, made of hard wood, with one inch deep moulding around the edge, and brass hook in each corner for fastening the legs of the animal; painted black with Asphaltum Paint; suitable for rats, guinea pigs, cats, and small dogs.

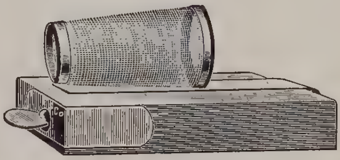
Length over all, inches	13	26
Width over all, inches	8	12
Each	**$3.35**	**4.80**

1-315. ANIMAL HOLDER, Dissecting Pan, made of heavy, black japanned sheet metal, with four cross-bars near the corners for fastening the legs of the animal; size, 11 inches long; 9 inches wide; sides 1½ inches. Melted wax may be conveniently poured into these pans, in the laboratory, if waxed bottoms are desired for pinning purposes. This holder is suitable for rats, guinea pigs, or similar small animals.

Each, $1.25

1-320

1-325



1-330

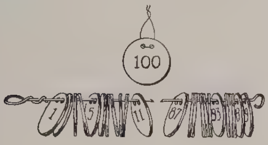
1-320. ANIMAL HOLDERS, Voge—for Guinea Pigs, made of zinc and perforated at the closed end for ventilation; used when inoculating and taking temperatures.

Length, inches	7	8
Diameter, inches	2½	3¼
Each	**$2.20**	**2.40**

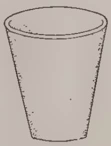
1-325. ANIMAL HOLDER, Kitasato—for Mice, consisting of a **Monel Metal Plate,** with spring clamp for holding the mouse by the skin of the neck and a clamp for fastening the tail or legs. The plate is attached to the support by means of a ball and socket joint, which is adjustable to any position; size of plate, 7 inches long and 3½ inches wide. **Each, $13.50**

1-330. ANIMAL HOLDER, Baltimore Health Dept. Model—for Mice; base made of zinc, **cage of non-rusting Monel Metal,** with adjustable clamp for holding the tail; a slot arrangement permits turning the animal for abdominal inoculation. **Each, $5.00**

ANIMAL JARS, with Heavy Wire Covers, see Animal Cages.



1-335



1-340

1-345

1-335. ANIMAL TAGS, for identifying animals under investigation; made of aluminum, ½-inch diameter, with two holes and sharp wire staples for attaching to ears. Cord or wire may be used to attach these tags to the legs of animals. Sold only in sets of 100, numbered consecutively. Any series of numbers other than 1 to 100 is made specially. **Sets include wire staples.** **Per set, $4.00**

1-340. ANNEALING CUPS, (Crucibles), Denver Make, of fine white clay, unglazed; originally intended for annealing gold buttons in Assay Work, and now found particularly adapted for igniting all forms of precipitates, including Silica and Barium Sulphate, because the precipitates do not fuse as readily to this crucible as to porcelain.

Size	A	B	C
Diameter, mm	30	32	38
Height, mm	30	32	38
Per dozen	**$2.50**	**2.50**	**2.50**

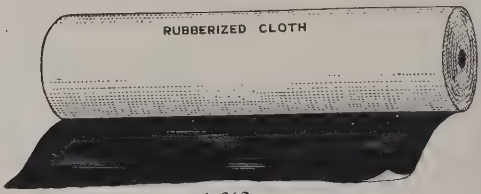
1-345. ANVIL, Square, made of steel, with polished face; suitable for general use and for Blowpipe Analysis; size 50x50x10 mm. **Each, $1.25**

ANVILS, with Vises, see Vises.

APRONS, OVERSLEEVES, AND COATS

1-350 1-355

1-360



1-362

1-350. APRONS, Students—Rubberized, bib style, with strings for fastening around the waist; made of black rubberized cloth. Recommended for University and High School Students where a medium grade, Rubberized Apron is desired.

Length over all, inches	40	46
Width at waist, inches	27	36
Each	**$1.10**	**1.35**

Per dozen, 10% discount.

1-355. APRONS, Chemists'—Rubberized, bib style, with strings for fastening around the waist; made of **extra quality,** black, rubberized cloth. This material is full calendered and steam cured; is soft and pliable and suitable for Chemists' and Instructors' use where the aprons must stand long, hard service.

Length over all, inches	46	50
Width at waist, inches	36	36
Each	**$1.75**	**2.00**

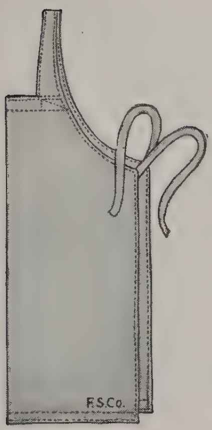
1-360. SLEEVES, Rubberized Cloth, same quality as No. 1-355 Chemist's Apron, with elastic bands at top and bottom; for protection up to the elbow. **Per pair, $ .75**

1-362. APRON CLOTH, Rubberized, of extra quality; made by covering a closely woven, white cloth with a coating of fine, black rubber. This makes a soft, pliable apron cloth and, at the same time, a very strong one, which is both water and acid proof, with a durability far above the average. It can be sewed together into aprons, over-sleeves, balance covers and microscope covers. It is often used, as it comes from the roll, as a dust protecting cloth, to cover apparatus set up for future use.

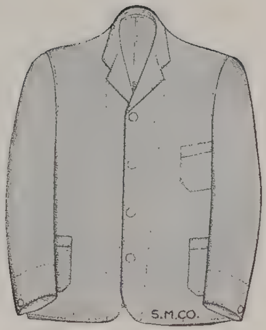
This rubberized apron cloth is 45 inches wide and is sold by the linear yard in any length desired.

Per linear yard, $1.25

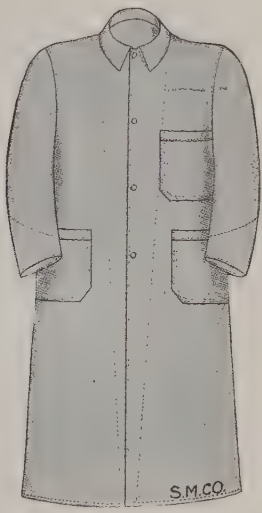
WHITE LABORATORY CLOTHES



1-365
See also No. 1-370



1-375



1-380

1-365. APRON, White Canvas, bib style, with strings for fastening around the waist; made of heavy cotton drill and thick enough to protect the clothing from the occasional splash in the laboratory; also suitable for general utility purposes in Stock Rooms, etc.; length, 42 inches; width at waist, 30 inches. **Each, $ .85**
Per dozen, 10% discount.

1-370. APRON, Asbestos, Cloth Lined, bib style, with straps and buckle for fastening around the waist; size, 40 inches long and 24 inches wide. The asbestos front is **fire and acid proof.** **Each, $5.50**

1-375. COATS, Short Form, of White Duck, made of seven-ounce material, with rolling notch collar, white buttons, double stitched, corners rounded in sack style, single breasted, with three pockets.

Chest measurement, inches	38	40	42
Each	**$3.50**	**3.50**	**3.50**

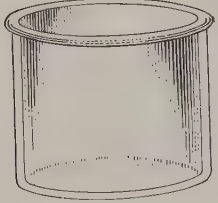
1-380. COATS, Long Form, of White Duck, made of seven-ounce material, fitted with metal snap-fasteners turn-over collar, double stitched, single breasted, with three pockets.

Chest measurement, inches	38	40	42
Each	**$4.75**	**4.75**	**4.75**

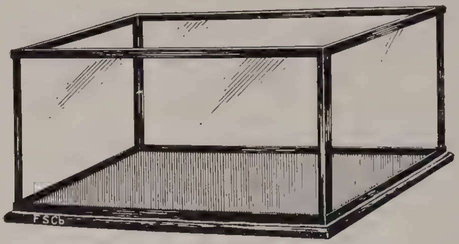
OTHER PROTECTIVE ARTICLES

Asbestos Gloves
Asbestos Mittens
Rubber Gloves
Finger Cots
Goggles
Respirators

These are listed alphabetically in this catalogue



1-385



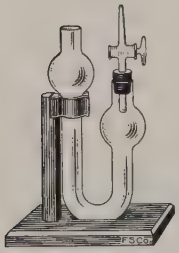
1-390

1-385. **AQUARIA, Round** (**Aquarium Jars**), of clear white glass, very heavy, with broad thick rim.

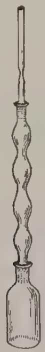
Capacity, gallons	1	2	3	5
Diameter, inches	7	9	10	12
Height, inches	6	8	9	11
Each	**$2.20**	**3.30**	**5.50**	**7.50**

1-390. **AQUARIA, Oblong, with steel frame,** slate bottom, heavy glass sides, guaranteed not to leak, as supplied the U. S. Bureau of Fisheries.

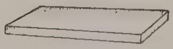
Size, No	1	2	3
Capacity, gallons	5	8	12
Length, inches	18	20	22
Width, inches	10	12	14
Height, inches	11	12	13
Each	**$15.00**	**16.50**	**19.00**



1-395



1-410



1-415

1-420

1-395. **ARSENIC DETECTION APPARATUS, Marsh,** of lamp-blown glass, with glass stopcock inserted through rubber stopper; neatly mounted on wooden support with slip-in clamp; height over all, about 12 inches. **Each, $3.50**

1-400. **GLASS "U" TUBE, including glass stopcock and rubber stopper,** for No. 1-395 Arsenic Apparatus. **Each, $2.00**

1-405. **WOODEN SUPPORT, with slip-in clamp,** for No. 1-395 Arsenic Apparatus. **Each, $1.50**

1-410. **ARSENIC DETECTION APPARATUS—Gutzeit-Bragg,** of glass with all ground joints. This form is used by the U. S. Bureau of Agriculture in food analysis. The procedure is as follows:

For generating Hydrogen, place a piece of Zinc and a small piece of Platinum along with a solution of dilute Sulphuric Acid, in the flask. The tube with four bulbs is stuffed with cotton, alternately saturated with lead acetate, for removing sulphuretted hydrogen. The top narrow tube is used to insert a strip of sensitized paper previously soaked in a solution of Mercuric Bromide. If the passing gas contains arsenic, a yellow stain will appear on the paper. **Each, $2.50**

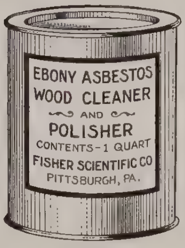
1-415. **ARSENIC PLATES** (**Streak Plates**), of unglazed porcelain, used in Arsenic Determinations and by Mineralogists; size approximately 100 x 60 x 4 mm. **Each, $ .40**

1-420. **ARSENIC TUBES,** of hard resistant glass.

Style	Straight	Bent
Length over all, mm	100	100
Diameter outside, mm	5	5
Each	**$ .10**	**.10**

Per hundred, 20% discount.

1-425



1-430

1-425. EBONY ASBESTOS WOOD, made of Asbestos Fiber, impregnated with an Asphaltum Cement Compound; highly resistant to water, alkalis and acids. Its advantages are: resiliency and adaptability to heat changes (*hot beakers may be placed upon Ebony Asbestos Wood without much risk of breakage*), structural strength, durability and insulating efficiency. Recommended for the following uses:

LABORATORY TABLE TOPS
SINK BOARDS AND HOUSINGS
HOOD LININGS OVER HOTPLATES
LABORATORY PARTITIONS
LININGS FOR FUME CABINETS
ELECTRICAL INSULATION

The following tests were made with 1/8-inch thickness:

30 Minutes in concentrated Sulphuric Acid, about 94%—no charring, no loss in weight.

10 Minutes in concentrated Nitric Acid—slight loss in weight, surface somewhat fuzzy under the microscope.

10 Minutes more in concentrated Nitric Acid—no further effect.

30 Minutes in strong Alkali—no effect, except a slight gray discoloration along the line to which it was submerged. Portion completely immersed was not affected.

Ebony Asbestos Wood is supplied in standard sheets 36 inches wide and 48 inches long. It is of such texture that it may be cut with an ordinary hand saw, set 5 teeth to the inch. We recommend the various thicknesses as follows:

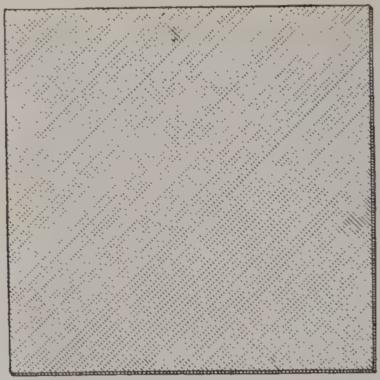
1/8 and 3/16 inch—for Fume Cabinet Linings, Wall Covering, etc.
1/4 and 3/8 inch—for Covering Table Tops, Sink Boards, etc.
1/2 inch—for Table Tops, Sink Boards, Partitions, etc.

Thickness, inches	1/8	3/16	1/4	3/8	1/2
Weight per sq. ft., pounds	1.5	2.1	2.8	4.3	5.4
Stock Sheets, 36 x 48 inches,					
Price per square foot	**$ .80**	**1.10**	**1.20**	**1.45**	**1.75**

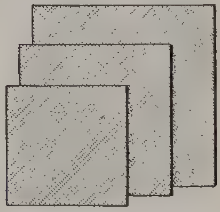
When preferred, special "cut-to-order" specifications can be supplied, ready for installation, for which prices may be obtained upon request.

1-430. EBONY ASBESTOS CLEANER AND POLISHER, specially made for Ebony Asbestos Wood; preserves the smooth, satin finish without injury. Special attention is called to the fact that no solvents of any kind, including alcohol, benzine, and gasoline, should be used for cleaning Ebony Asbestos Wood. Also, it should never be varnished or shellacked.

The Cleaner and Polisher is supplied in one quart cans and lasts a long time, because very little is required to keep Ebony Asbestos Wood in good condition. **Per Quart Can, $1.50**



1-435 1-445



1-440

1-435. ASBESTOS BOARD, sheets, 40 x 40 inches; manufactured from asbestos fiber, with a suitable binder, rolled into sheets, with pebbled surface, of porous texture, but sufficiently stiff for handling; used on table tops to protect them from the heat of burners and any place where heat insulation is desired. This Asbestos Board is fire and acid proof.

Thickness, inches	1/32	1/16	1/8	3/16	1/4
Weight per sheet, approx., pounds	3.5	5.0	9.0	13.0	14.0
Per pound (crating extra)	**$ .20**	**.20**	**.20**	**.20**	**.20**

Prices given, do not include the necessary crating. Crates are charged extra, at cost.

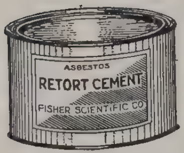
1-440. ASBESTOS BOARD MATS, Squares, used for placing under hot Beakers, Flasks and Dishes, and for heat insulation where small areas are involved. The quality is the same as No. 1-435.

Size, inches	4 x 4	5 x 5	6 x 6
Per dozen	**$ .55**	**.70**	**.90**

Per gross, 20% discount.

1-445. ASBESTOS WOOD, Transite Board, of hard, durable, asbestos composition, with smooth surface; fire and acid proof. Asbestos Wood is used for building apparatus, for table tops, for heat and electrical insulation and can be cut with an ordinary saw. **Supplied in standard sheets, 36 inches wide and 48 inches long.**

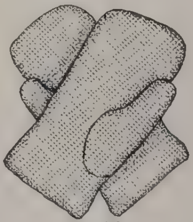
Thickness, inches	1/8	3/16	1/4
Per square foot	**$ .35**	**.55**	**.75**



1-450

1-455

1-460



1-465

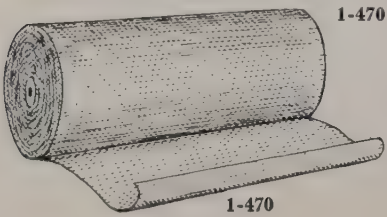
1-450. ASBESTOS CEMENT, Retort Cement, for cementing retorts, muffles, electric furnaces, etc., and for covering and protecting the heads of countersunk screws and bolts in table tops, sink boards, and in fume cabinets. The Cement is fire and acid proof, is plastic in form, and easily applied. **Per 5-lb. can, $ .90**

1-455. ASBESTOS CORD, Twine, a convenient form of insulation, specially for wrapping the handles of apparatus which become hot; also, for suspending crucibles, retorts, etc. Made in two sizes; on spools of one pound each.

Diameter, inch	1/16	1/8
Per pound	**$2.10**	**2.10**

1-460. ASBESTOS GLOVES, made from asbestos thread, provided with separate places for thumb and four fingers. The gloves are large size, loose fitting, fleece lined, and are long enough to protect the wrists when handling tongs before a furnace. **Per pair, $3.30**

1-465. ASBESTOS MITTENS, made from asbestos thread, with separate place for thumb only, otherwise the same as No. 1-460. **Per pair, $3.00**



1-470

1-470. ASBESTOS PAPER, for filtering acids, made of pure asbestos fiber, about 1/64 inch thick and 36 inches wide, weighing approximately one pound per square yard; supplied any length, 36 inches wide. Minimum quantity, 1 pound. **Per pound, $ .20**

ASBESTOS FIBER, see Reagent List in the rear of this catalogue.

ASBESTOS FINGER COTS, see Finger Cots.

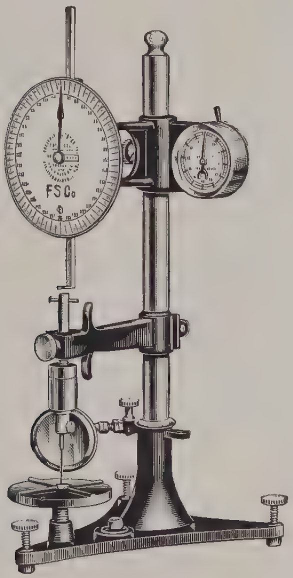
ASBESTOS POWDER, see Reagent List in the rear of this catalogue.

ASBESTOS WOOL, see Reagent List in the rear of this catalogue.

ASCARITE, see Combustion Apparatus—Absorption Bulbs.

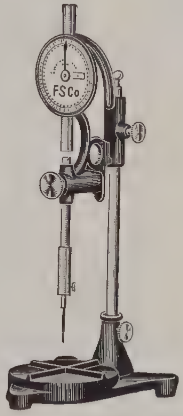
APPARATUS FOR TESTING

ASPHALT AND ALLIED SUBSTANCES



1-475

See also No. 1-485



1-480

The apparatus illustrated and described in this section is the result of a study of the new standard specifications and the methods employed by the prominent laboratories working in this field.

We have ascertained the necessary requirements, and have made a design and specifications for every apparatus listed, so that it should not be confused with another apparatus which may be similar in appearance, but may give a different result on account of variations in dimensions and other controlling specifications.

For further details of the methods for which this apparatus has been designed, see:

Methods Used by the Barrett Company, by J. M. Weiss, published in Journal of Industrial and Engineering Chemistry in September, October, November and December, 1918.

Laboratory Manual of Bituminous Materials by Prevost Hubbard.

Standard Methods of the American Society for Testing Materials. (A.S.T.M.)

Methods of the Chemists of the United States Steel Corporation "*Sampling and Analysis of Coal, Coke and By-Products.*"

Methods for Examination of Bituminous Road Materials, as used by the United States Department of Agriculture—Bureau of Public Roads.

Gas Chemists' Hand Book, compiled by the American Gas Association.

Asphalts and Allied Substances, by Herbert Abraham.

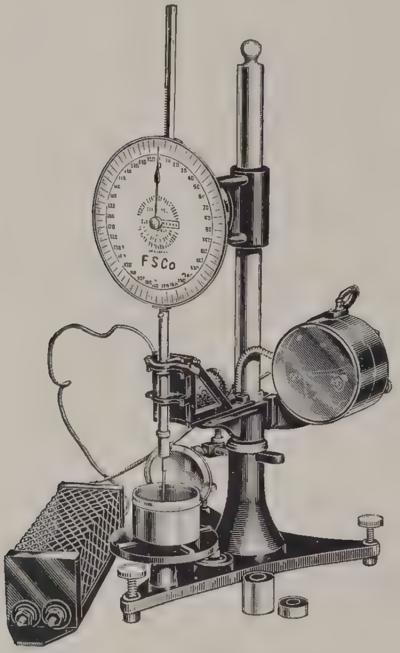
1-475. PENETROMETER. New York Testing Laboratory Design. An instrument for determining the consistency of asphalt, bitumen, tar, rubber, etc., by ascertaining the distance a weighted standard needle will penetrate into the sample, under standard conditions of time, temperature and load.

This instrument is regularly supplied with two Standard No. 2 Roberts Needles. The dial is graduated to show penetration to 0.1 mm. The penetrometer is supplied with weights for loads of 50, 100, and 200 grams and a **standard clock** for timing duration of test by ½ second beats. For Sample Cup, see No. 1-520.

For method, see *Laboratory Manual of Testing Bituminous Materials*, Hubbard; also *Tests for Penetration of Bituminous Materials, Serial No. D5-21*, A.S.T.M. Standards, 1924; also *Bulletin No. 314*, U. S. Department of Public Roads; and *The Modern Asphalt Pavement*, Richardson. **Each, $100.00**

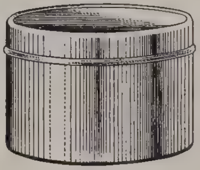
1-480. PENETROMETER, Miniature-Portable, without clock, but otherwise built along the lines of No. 1-475 Penetrometer, and about one-half size. The bar is standardized to 100 grams, and the Standard No. 2 Roberts Needle, the same as supplied with No. 1-475, is furnished. A stop-watch is used for timing the operation of this instrument. For Sample Cup, see No. 1-520. **Each, without stop-watch, $50.00**

1-485. STOP-WATCH, for use with No. 1-480 Penetrometer. **Each, $13.50**



1-500
See also No. 1-490 and No. 1-505

1-510



1-520

1-490. PENETROMETER, Automatic, Electrically Controlled. This instrument is the New York Testing Laboratory type, similar to No. 1-475, but **equipped with a magnetic clock,** by which the needle is automatically released, allowed to penetrate for a given length of time and then automatically stopped. In this way, the personal equation is eliminated and each test is made with clock-work accuracy. The dial, which indicates the depth of penetration, is graduated so that each 10 degrees traversed by the indicator is equal to 1 mm. penetration, and the single degrees indicate 0.1 mm. of penetration.

The illustration shows the sample in position, ready for the test. For A.S.T.M. Sample Cup, see No. 1-520.

The source of power may be a Battery of 8 Dry Cells, or its equivalent. If desired, current may be drawn either from a 110 volt D.C. circuit, by connecting a reducer (rheostat) in series with the penetrometer, or from a 110 volt A.C. circuit, by similarly connecting a rectifier.

Under this catalogue number (1-490), the penetrometer with magnetic clock is supplied, but **without batteries or other accessories for D.C. or A.C.** **Each, $260.00**

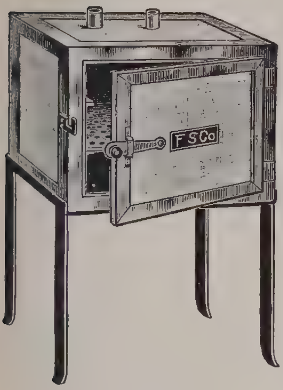
1-495. BATTERY SET (8 Dry Cells), for use with No. 1-490 Penetrometer. **Per set, $3.50**

1-500. PENETROMETER, Automatic-Electric, for use with a **110-Volt D.C.** circuit; including reducer (rheostat), as shown in illustration. **Each, $260.00**

1-505. PENETROMETER, Automatic-Electric, for use with a **110-Volt A.C.** circuit; including rectifier. **Each, $275.00**

1-510. PENETROMETER NEEDLE, Standard No. 2 Roberts, as regularly supplied with Penetrometers No. 1-475, No. 1-480, and No. 1-490. **Each, $1.50**

1-520. ASPHALT SAMPLE CUP, for use with Penetrometers; of seamless tin, round, gill style, high form; capacity, 3 ounces; diameter, $2\frac{3}{16}$ inches; height over all, $1\frac{5}{8}$ inches. For use in Drying Ovens; recommended in the A.S.T.M. *Standard Specifications for 1924*, page 947, *Serial No. D6-20*, "Loss on Heating Oil and Asphaltic Compounds." **Per dozen, $ .60**
Per gross, 10% discount.



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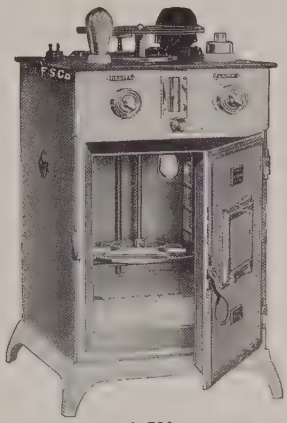

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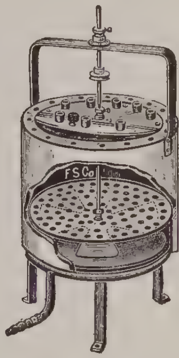


1-540

1-525. DRYING OVEN, BARRETT. For determining the evaporation of tars, pitches, etc., at 163° C., as described in Barrett Test D-10. For method, see also *Jour. Ind. Eng. Chem.*, X, 817 (Oct., 1918). The oven is made of copper, single walled, covered with asbestos inside and outside, except the bottom, and supplied with one perforated shelf placed 2½ inches from the bottom. The oven is 10 inches wide, 8 inches high, 8 inches deep and mounted on 4 iron legs. **Each, $30.00**

1-530. ASPHALT DRYING OVEN, Freas, Electric—A.S.T.M. Pattern, Constant temperature, automatically controlled; with motor driven, perforated revolving shelf of A.S.T.M. specifications. For determining Loss in Weight (exclusive of water) of Asphaltic Compounds when Heated, according to A.S.T.M. *Standard Specifications for 1924*, Serial No. D6-20.

This oven is capable of maintaining the desired temperature of 163° C., within a fraction of a degree and is made with double walls of heavy transite.

Frames and door are of cast aluminum, and the heating element is a wire-wound resistance plate, easily removable for replacement when necessary. The Patent Regulator is entirely of metal and, by "making and breaking" the contact, without arcing, any degree of heat from room temperature to 175° C. may be maintained continuously by attaching to an ordinary lamp socket. Inside dimensions are 12x12x12 inches and oven is mounted on a low base of cast iron. The heating element is wound for 600 watts at 110 volts A.C., unless otherwise specified. Without thermometer. **Each, $240.00**

1-532. THERMOMETER, for use with No. 1-530 Asphalt Drying Oven; length, 6 inches. For immersing in the material. Calibrated 155 to 170° C., in ½° divisions. **Each, $6.00**

1-540. ASPHALT DRYING OVEN, Gas Heated, New York Testing Laboratory Design, as used for determining Loss in Weight (exclusive of water) of Asphaltic Compounds. For Method, see A.S.T.M. *Standard Specifications for 1924*, Serial No. D 6-20, "Loss on Heating Oil and Asphaltic Compounds." No. D6-20.

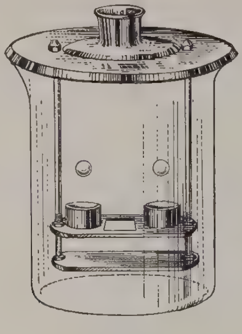
Oven is made of Russia iron, double wall, asbestos covered; with revolving shelf and a fan to equalize the temperature and hasten drying; supplied with a ring gas burner. Inside diameter, 9½ inches; inside height, 8 inches. **Each, $37.50**

1-545. THERMOMETER, for use with No. 1-540 Drying Oven, etched stem, about 6 inches long, graduated 150° to 175° C., in 1° divisions, and standardized for total immersion. **Each, $4.00**

BIBLIOGRAPHY

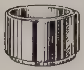
We recommend the following standard works. These, and other scientific books, can be supplied, at the publisher's prices, within a few days after receipt of order, and shipped along with other laboratory requirements.

Abraham, H., "*Asphalts and Allied Substances*"	$6.00
Cross, R., "*Handbook of Petroleum, Asphalt and Natural Gas*"	7.50
Hubbard, P., "*Laboratory Manual of Bituminous Materials*"	1.50
Kewley, J., "*Petroleum and Allied Industries*"	3.50
Parr, S. W., "*Analysis of Fuel, Gas, Water and Lubricants*"	2.50
Wagner, F. H., "*Coal and Coke*"	5.00



1-550

1-565



1-570

1-550. **SOFTENING POINT APPARATUS (Ring and Ball Method) A.S.T.M.,** for the determination of softening points of bituminous materials, other than tar products. Apparatus consisting of 2 standard balls; 2 standard rings; 800 ml. Pyrex beaker for the immersion liquid, also a metal cover. An opening in the cover is provided for the insertion of a thermometer. For Method, see A.S.T.M. *Standard Specifications for 1924*, Serial No. D 36-24, "Test for Softening Point of Bituminous Materials." Supplied with Pyrex beaker, but without thermometer. (For thermometers, see No.1-555, and No. 1-560.)
Price, without thermometer, $8.50

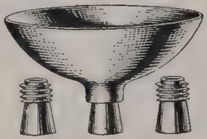
SOFTENING POINT APPARATUS, for hard pitchers, see No. 1-665.

1-555. **THERMOMETER, A.S.T M., graduated 0 to 80° C. in $^1/_5$° divisions,** etched on stem, standardized at total immersion; about 400 mm. long, for use with No. 1-550 Softening Point Apparatus, Ring and Ball Method, A.S.T.M. *Standard Specifications for 1924*, Serial No. D 36-24. Made according to the specifications of the American Society for Testing Materials. **Each, $7.00**

1-560. **THERMOMETER, A.S.T.M., graduated 30° to 180° C. in ½° divisions,** etched on stem, standardized at total immersion; about 380 mm. long, for use with No. 1-550 Softening Point Apparatus, Ring and Ball Method, A.S.T.M. *Standard Specifications for 1924*, Serial No. D 36-24. Made according to the specifications of the American Society for Testing Materials. **Each, $7.50**

1-565. **STEEL BALL, A.S.T.M., for Softening Point Apparatus No. 1-550;** made of highly polished steel, weighing between 3.45 and 3.55 grams, as used with Ring and Ball Method, *A.S.T.M. Standard Specifications for 1924*, Serial No. D 36-24. **Each, $1.00**

1-570. **BRASS RING, A.S.T.M., for Softening Point Apparatus No. 1-550;** made of polished brass, according to the A.S.T.M. *Standard Specifications for 1924*, Serial No. D 36-24. With additional rings, samples may be prepared in advance, avoiding the necessity of stopping to clean the two regularly supplied with the apparatus. **Each, $1.00**



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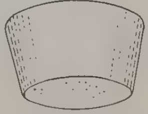
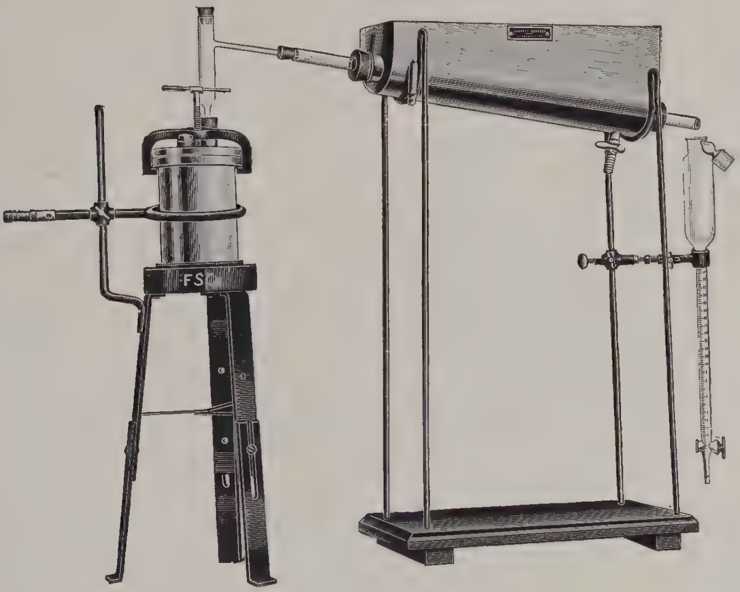


1-580

1-575. **ASPHALT VISCOSIMETER (Float Tester), A.S.T.M. Design.** For determining the consistency of bituminous materials by means of a specially designed float. Can also be used for creosote oil residues. Consists of an Aluminum Saucer Float, 93 mm. diameter, and 3 Brass Collars which hold the sample and screw into the base of the float. For complete description and Method, see A.S.T.M. *Standards 1923*, Method of Float Test for Bituminous Road Materials, No. D 139-24-T, and also A.S.T.M. *Standard Specifications for 1924*, Serial No. D 38-24, "Sampling and Analysis of Creosote Oil." **Each, $12.50**

VISCOSIMETERS, for testing viscosity of Bituminous Materials, see Petroleum Testing Apparatus.

1-580. **BITUMEN GOOCH CRUCIBLE, Porcelain, for Determination of Bitumen.** Specified in A.S.T.M. *Standards 1924*, Method of Test for the Determination of Bitumen, No. D 4-24 T. Dimensions: diameter at top, 45 mm.; diameter at bottom, 35 mm.; depth, 25 mm.; capacity, 40 ml. **Each, $ .60**



1-585

1-585. TAR DEHYDRATING APPARATUS, A.S.T.M. Design, for dehydrating Tars and other Bituminous Materials, and for the determination of Water in Creosote Oils; described in A.S.T.M. *Standard Specifications for 1924*, Serial No. D 38-24, and No. 114-21-T. Used in Barrett Method described in *Jour. Ind. Eng. Chem.*, X, 732 (Sept., 1918). This is the apparatus used in the standard method of the Chemists of the United States Steel Corporation. Complete outfit consists of a copper Still, 3¾ inches inside diameter and 6¼ inches inside height; Ring Burner with Clamp; adjustable Tripod with Arm Support; glass Still Head (Connecting Tube); Condensing Trough with glass Condensing Tube; glass-stoppered Separatory Funnel, used as Receiver, and clamp for holding the funnel. Thermometer No. 1-590, graduated 0 to 250° C., in 1° divisions, is recommended for use with this apparatus, but is not supplied with the outfit. **Price (without thermometer), $42.50**

1-590. THERMOMETER, Distillation, A.S.T.M. Made according to the specifications of the American Society for Testing Materials; etched on stem, graduated **0 to 300° C., in 1°** divisions; nitrogen filled; length, 380 mm.; calibrated for total immersion. The zero mark is about 100 mm., from the bottom of the bulb. Used with the A.S.T.M. Tar Dehydrating Apparatus No. 1-585. **Each, $5.00**

1-595. STILL, DEHYDRATING, A.S.T.M. Design, of heavy copper, 3¾ inches inside diameter and 6¼ inches inside depth, with heavy collar and strong metal clamp for fastening the lid. Used with No. 1-585 Apparatus. **Each, $16.50**

1-600. BURNER, Ring. Designed for use with No. 1-585 Apparatus, **with clamp holder** for attaching to the support. This burner surrounds the still and the holes are on the inside of the ring, so that the flames play against the still. **Each, with clamp holder, $2.80**

1-605. TRIPOD WITH SUPPORT ARM. With **adjustable legs** for heights 10 to 15 inches; of extra heavy iron and solid construction. The Support Arm is very convenient for attaching the Ring Burner. Used with No. 1-585 Apparatus. **Each, $6.50**

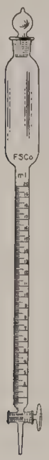
1-610. STILL HEAD (Connecting Tube), A.S.T.M. Design, of well annealed glass, used for insertion of Thermometer and for connecting Still to Condenser Tube. Used with No. 1-585 Apparatus. **Each, $ .85**

1-615. CONDENSING TROUGH, A.S.T.M. By-Product Design. Made of Copper, 15¼ inches long, supported on a heavy wooden base. Used with No. 1-585 Apparatus, and with No. 1-630 Retort-Still; described in A.S.T.M. *Standard Specifications for 1924*, Serial No. D 114-21-T. This condensing trough has a glass condensing tube mounted at an angle of 75 degrees to the vertical; the bottom of the trough is parallel to the condensing tube, and the stand for the trough is high enough to accommodate the separatory funnel receiver. **Each, $12.50**

1-620. CONDENSER TUBE, of well annealed **lime glass;** 600 mm. long, diameter 15½–17½ mm. outside. For use with No. 1-615 Distillation Trough. **Each, $ .75**

1-625. CONDENSER TUBE, of **Pyrex glass;** 600 mm. long, diameter 15½–17½ mm. outside. For use with No. 1-615 Distillation Trough. **Each, $1.25**

Asphalt Apparatus



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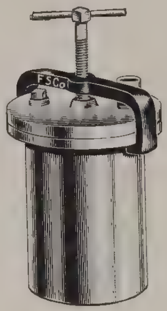

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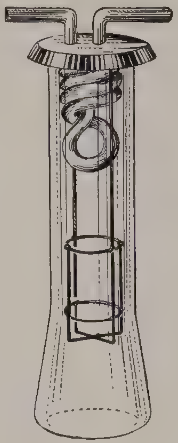


1-645

1-655

1-627. SEPARATORY FUNNEL, Barrett Design, used as a convenient receiver for No. 1-585 Apparatus in the dehydrating of Tar and other Bituminous Materials. Capacity, about 120 ml., the first 20 ml. of which is accurately graduated in 0.1 ml. Described in A.S.T.M. *Standard Specifications for 1924*, Serial No. D 114-21-T, "Method of Test for Water in Bituminous Materials." With this funnel, one is able to measure the water, then withdraw it and retain the oil. **Each, $4.00**

1-630. RETORT-STILL, Koppers Design, for dehydrating and coking. This retort is made of very heavy brass and copper, is larger and heavier than the A.S.T.M. design; its inside dimensions are 5 inches diameter and 7½ inches high. Used by The Koppers Company for dehydrating tests (the other apparatus being the same as No. 1-585), and also used for coking the residue.

Price, without burner or tripod, $23.50

1-635. BURNER, Koppers, Ring Form. This burner is designed and made especially for heating the Koppers Retort No. 1-630. The holes are on the inside of the burner so that the flames play against the retort. **Supplied with clamp holder** for attaching to the support. **Each, with clamp holder, $4.00**

1-640. TRIPOD WITH SUPPORT, Koppers. For use with Koppers Retort No. 1-630; made very heavy and strong; adjustable for heights of 10 to 15 inches. The support arm is convenient for attaching the ring burner. (For illustration, see No. 1-585.) **Each, $6.50**

For use with No. 1-630 Koppers Retort-Still, see

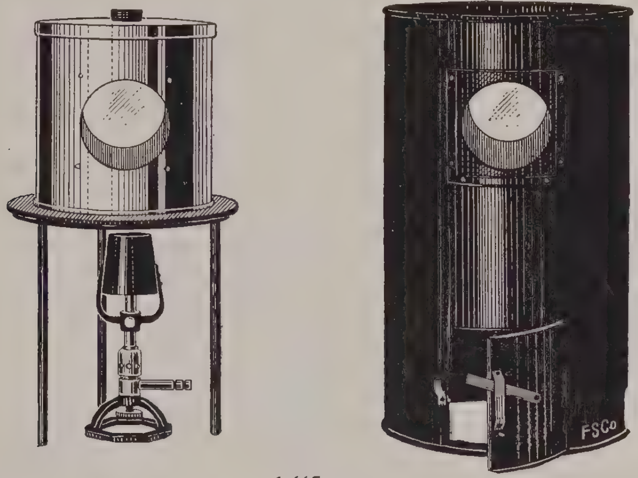
Connecting Tube	No. 1-610.
Condensing Trough	No. 1-615.
Separatory Funnel	No. 1-627.
Thermometer	No. 1-590.

1-645. BITUMEN EXTRACTION APPARATUS, A.S.T.M. Type; for determining "Matter-insoluble-in-benzol" in the Analysis of Asphalts, Coal Tars, Creosote Oils and similar materials. Consists of a special glass Flask, block tin Condenser, and nickel-silver wire Support for holding the Filter Cup. For Method, see A.S.T.M. *Standard Specifications for 1924*, Serial No. D 38-24, "Sampling and Analysis of Creosote Oil."

Price, without filter cup, $4.00

1-650. EXTRACTION FLASK, A.S.T.M. Type, of glass, made especially to A.S.T.M. specification, for use with No. 1-645 Extraction Apparatus. **Each, $ .60**
Per dozen, 10% discount.

1-655. FILTER CUP, RA-98 coarse Alundum. For use with No. 1-645 Extraction Apparatus, as specified A.S.T.M. *Standard Specifications for 1924*, Serial No. D 38-24. Dimensions of thimble, 30 mm. diameter, 80 mm. high. **Each, $ .50**

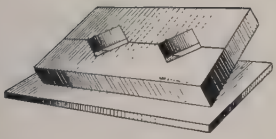


1-665

1-665. SOFTENING POINT APPARATUS, Barrett Type. Used to determine the softening point of hard pitches melting above 77° C. (170° F.). The Oven is made of Copper, is 6 inches diameter and 6⅛ inches high, has two mica windows, each 3 inches diameter; seams are interlocked; no solder is used. The cover has an opening for the thermometer and has a ring attached to the lower side which is used to support the wires holding the test cubes. A removable shelf is provided. Samples used in the test are ½ inch cubes made in Mold No. 1-675. For details of the method see *Jour. Ind. Eng. Chem.* X, 817 (Oct., 1918).

The apparatus includes **oven, tripod, burner, burner chimney,** and a **surrounding shield;** without thermometer. **Each, $20.00**

1-670. THERMOMETER, Barrett Type, range **30 to 180° C., in ½°** for use with No. 1-665 Apparatus. Length over all, about 380 mm.; 30° mark is 75 mm. from the bottom of the bulb. **Each, $7.50**



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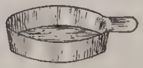


1-685

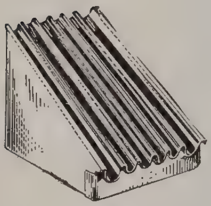
1-675. PITCH MOLD, Double, for Softening Point Test, U. S. Bureau of Roads Type. For making two ½-inch cubes of Pitch, or other Bituminous Materials, for the Softening-Point-Test. Method described in *Bulletin No. 314* of the *United States Bureau of Public Roads;* A.S.T.M. *Standard Specifications for 1924*, Serial No. D 61-24, and *Jour. Ind. Eng. Chem.* X, 817 (Oct., 1918).

The mold is made of brass, in two pieces, and rests on a brass plate. It makes two cubes at a time, and is more convenient than the single mold, which we have discontinued. **Each, $6.50**

1-680. SAMPLER, Barrett Type. For sampling liquids in tanks, cars, etc., made of galvanized iron, with weighted bottom so it will sink in liquids of high specific gravity; size, about 5 inches diameter and 7 inches high to the neck. Used to obtain samples of oils at various depths. The sampler is finished in black enamel. **Each, $9.00**

1-685. EVAPORATING DISH, Barrett Type. For evaporating tars and pitches in Barrett test D 10, *Jour. Ind. Eng. Chem.* X,817 (October, 1918). Dish is made of pure nickel; diameter 2 inches at bottom and 2⅛ inches at top, and is 9/16 inch high; made with handle. **Each, $2.25**

Asphalt Apparatus



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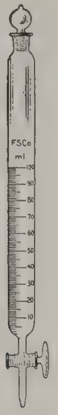

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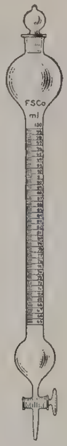

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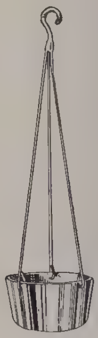


1-702

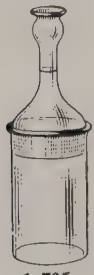
1-690. SLIDE BOX, Barrett Type. For the slide test of pitch. Described in *Jour. Ind. Eng. Chem.* X, 817 (Oct., 1918). Made of copper, 4¾ inches wide and 6¼ inches long, with 6 corrugations, 4 of which are ¾ inch wide and 2 are ⅞ inch wide. The slide is inclined at an angle of 30 degrees to the horizontal. **Each, $5.00**

OVEN, for use with Slide Box, No. 1-690, see Ovens, Drying, double wall, 10x12x10 inches.

1-695. TAR-ACID SEPARATORY FUNNEL, Barrett Type, No. 1. For testing tar-acid in creosote oils, etc., where the tar-acid content is 25% or more. Capacity of funnel is about 200 ml., graduated from the stopcock to 100 ml., in 1 ml., divisions. Made with special stopcock of large size and bore. Method, see *Jour. Ind. Eng. Chem.* X, 911 (Nov., 1918). **Each, $4.50**

1-700. TAR-ACID SEPARATORY FUNNEL, Barrett Type, No. 2. For testing tar-acid in creosote oils, etc., where the tar-acid content is less than 25%. If the quantity being distilled is less than 65 ml., naphtha is added to bring the volume up to the 65 ml. mark on the graduated portion of the funnel. The lower bulb, up to the first graduated mark, holds exactly 65 ml., and from there to 100 ml., the divisions are in ⅕ ml. Made with special stopcock of large size and bore. For method, see *Jour. Ind. Eng. Chem.* X,911 (November, 1918). **Each, $5.25**

1-702. SPECIFIC GRAVITY BALANCE PAN, A.S.T.M. Type. For use with solid, or semi-solid fractions of oil, which cannot be readily liquefied. Pan made of **pure nickel,** 20 mm. diameter at bottom and 25 mm. diameter at top; provided with suspension wires and hook for attaching to No. 2-150 Westphal Specific Gravity Balance. This is used in test described in A.S.T.M. *Standard Specifications for 1924,* Serial No. D 38-24, "Methods of Analysis of Creosote Oil." **Each, $3.50**



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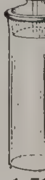

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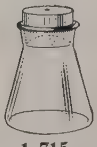
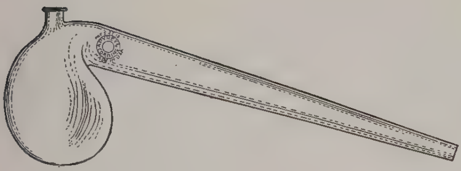


1-715

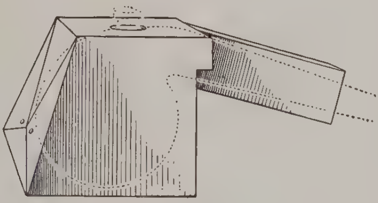
1-705. SPECIFIC GRAVITY BOTTLE, Barrett Type, graduated 50 ml..capacity; for the determination of specific gravity of Tar and Pitch. For method see *Jour. Ind. Eng. Chem.* X, 732 (Sept., 1918). Bottle is made of glass, with top ground to fit; calibrated and marked at 50 ml. **Each, $1.75**

1-710. SPECIFIC GRAVITY BOTTLE (Pycnometer), A.S.T.M. Type, Hubbard form; for determining the specific gravity of Road Oils, Road Tars, Asphalt Cements, and Soft Tar Pitches; recommended in A.S.T.M. *Standards, 1924* No. D 70-20-T. Bottle is made of glass with ground-in stopper having a 1.6 mm. hole; capacity, about 24 ml.; height, about 70 mm.; diameter, about 22 mm. **Each, $1.65**

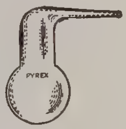
1-715. SPECIFIC GRAVITY BOTTLE (Pycnometer), Hubbard-Carmick, Erlenmeyer form, a modified Hubbard type, for use with viscous fluids, semi-solid bitumens and emulsions. The bottle is made of lamp-blown glass about 45 mm. high, 40 mm. diameter at bottom, and 25 mm. diameter at the mouth. The stopper is made of solid glass, carefully ground to fit the neck, and a 1 mm. hole in the center permits the stopper to be easily inserted when the flask is filled with a viscous oil. The lower surface of the stopper is made cup-shaped to allow air bubbles to escape through the bore. The bottle has a capacity of about 25 ml., and weighs about 25 grams. For Method, see *U. S. Department of Agriculture, Bulletin No. 949,* October 10, 1921, page 36, Test No. 19. **Each, $1.65**



1-725



1-730

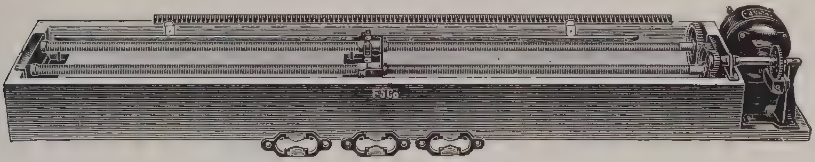


1-735

1-725. CREOSOTE RETORT, A.S.T.M. Type. Made of **Pyrex** glass, with tubulation; according to A.S.T.M. *Standard Specifications for 1924*, Serial No. D 38-24, "Methods of Analysis of Creosote Oil." The rated capacity of this retort is 275 ml. **Each, $2.40**

1-730. RETORT SHIELD, for Creosote Retort. Made of galvanized iron, asbestos lined. Protects the retort from air currents and prevents radiation. Used in A.S.T.M. Method, Serial No. D38-24 with No. 1-725 Creosote Retort. **Each, $4.50**

1-735. COKE BULB, A.S.T.M. Type. Made of **Pyrex** glass; diameter of bulb, 15 mm. Used for coke residue tests as described in A.S.T.M. *Standard Specifications for 1924*, Serial No. D 38-24, "Methods of Analysis of Creosote Oil." This bulb and method is also described in *Jour. Ind. Eng. Chem.* X, 911 (Nov., 1918). **Each, $ .25**



1-740 **1-745**

See also No. 1-750

1-740. DUCTILITY TESTING MACHINE, Improved Smith Type, with a 110 cm. pull. With this machine, the ductility of an asphalt cement, or semi-solid bitumen, is determined by measuring the distance to which it will elongate before breaking, when two ends of a briquette are pulled apart at a specific rate of speed, and at a specific temperature. For method see A.S.T.M. D-113-22-T.

Machine is built in a stone trough, painted inside and outside with enamel, in which the briquettes are immersed in water at 77° F. Three Standard Briquette Molds are supplied and included in the price. The working parts are made of brass to prevent rusting.

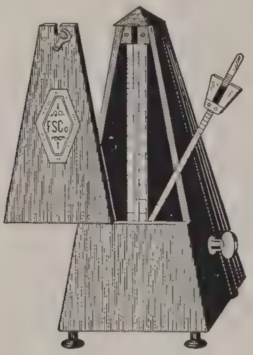
The test is conducted at a speed of 5 cm. a minute of 64 "clicks"; the clicking device is usually synchronized with Metronome No. 1-755, set for 64 beats a minute. The test pieces are briquettes made in mold No. 1-760, and the machine will pull three briquettes at a time.

This machine is supplied **with motor for 110-volt, 60-cycle, single-phase, alternating current.** **Price, including boxing, $297.00**

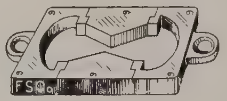
1-745. DUCTILITY TESTING MACHINE. Similar to No. 1-740, but **with motor for 110-volt D.C.** **Price, including boxing, $297.00**

1-750. DUCTILITY TESTING MACHINE. Similar to No. 1-740, but **arranged for operation by hand.** **Price, including boxing, $292.00**

Asphalt Apparatus



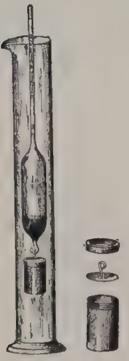
1-755



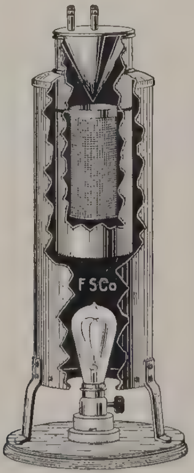
1-760

1-755. METRONOME. Used for synchronizing the "clicks" at 64 per minute, in standardizing the rate of pull for Ductility Test of Bituminous Materials with Smith's Ductility Machine, No. 1-740. Other uses include counting seconds and fractional parts of a second in Viscosity Tests, instead of timing with a stop-watch. It is also used as a Demonstration Instrument in schools. The Metronome has a well-finished hardwood case, is accurate and stands about 7 inches high. **Each, $6.50**

1-760. ASPHALT BRIQUETTE MOLD, A.S.T.M. Type. For making briquettes for Ductility Test of Asphalt Cement, or semi-solid Bitumen. This mold is made of brass; the finished briquette measures 75 mm. long, 10 mm. thick and 10 mm. in width at the minimum cross section, half way between the "clips." For complete description, see A.S.T.M. *Standard Specifications for 1924*, Serial No. D 113-22-T, "Method of Test for Ductility of Bituminous Materials." This mold is recommended for use with Smith Ductility Machines, Nos. 1-740, 1-745 and 1-750. **Each, $7.50**



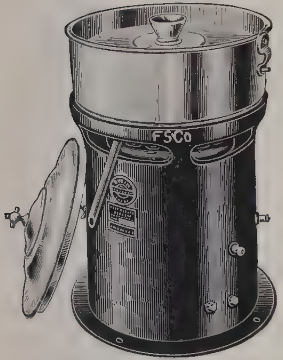
1-765



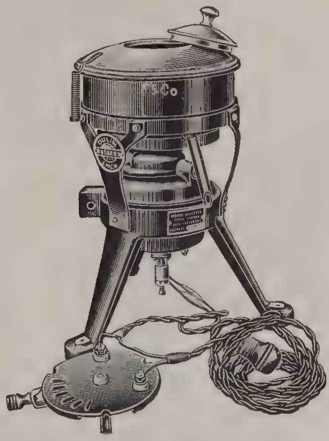
1-770

1-765. ASPHALT HYDROMETER, Sommer Patent, for determining the Specific Gravity of Asphalt, Wax, and all kinds of semi-solid, semi-adhesive and plastic materials; calibrated from 0.850 to 1.300 Sp. Gr. at 25° C. Hydrometer proper is made of glass, with a hook on the bottom, to which is attached the brass receptacle for the sample. It is supplied with a glass hydrometer jar and directions for using. **Each, $15.00**

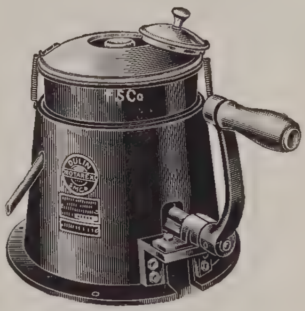
1-770. BITUMEN EXTRACTOR, New York Testing Laboratory Type, for analysis of paving mixtures containing broken stone. Extractor is made of metal, consisting of a basket for the sample, conical condenser, cylindrical vessel for solvent, 16 C.P. carbon incandescent lamp for heating, and outside metal cylinder mounted on three legs. A 500 gram sample of mixture should extract clean with carbon disulphide, in about 3 hours. For method see Hubbard—*"Laboratory Manual of Bituminous Materials."* **Each, $55.00**



1-775



1-780



1-785

1-775. ROTAREX BITUMEN SEPARATOR, Dulin, 1000 grams Capacity, Motor Driven, for determining the Bitumen Content in Asphaltic Pavement Mixtures. The Separator is fitted with an Aluminum Bowl mounted on a vertical shaft; an Aluminum Catch-Basin, draining to a spout, for the recovery of the solvent, and a Two-Piece Cover, which closes the entire apparatus.

In operation, the Sample is weighed, heated, broken up, and the Solvent added, in a separate vessel. After the Solvent has acted, the Mixture is placed in the Bowl of the Separator and the centrifugal force expels the liquid through the Filter Paper Gasket (or Ring) at the edge of the Bowl, thereby drying the Sample. More Solvent is added and the process repeated until only clean Solvent is thrown out. The Filter Paper Ring is then burned and the Ash added to the Sample, before final weighing. The weights before and after extraction permit the determination of the constituent proportions. The entire operation is completed in about 10 minutes.

Supplied with Universal Motor which can be operated on 110-volt D.C., or on 110 volt, 60 cycle A.C. A large sized Rheostat is supplied and is connected in line with the Rotarex; the wiring is carried directly to this. Directions for operating are supplied with the instrument. **Each, $185.00**

1-780. ROTAREX BITUMEN SEPARATOR, Dulin, 50 grams Capacity, Motor Driven. This Separator is built on the same principle as the larger size, No. 1-775. See full description above.

Supplied with Universal Motor for 110-volt D.C., or 110-volt, 60-cycle A.C. Machine is inclosed in a cast iron frame; supplied with Rheostat, Cord and Plug, and Directions for operating.

Each, $95.00

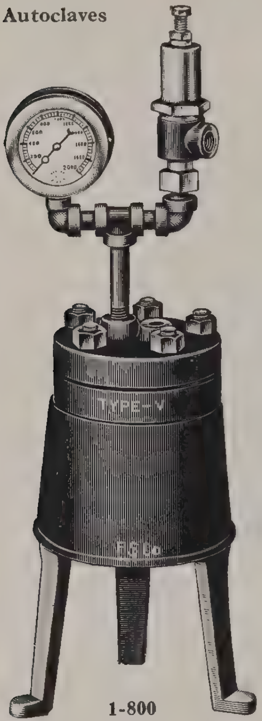
1-785. PLUG FOR 220-VOLT, Current with Extra Socket, for operating Dulin Rotarex Separators in series with a 110-volt Incandescent Lamp, on a 220-volt circuit. **Each, $2.50**

1-790. ROTAREX BITUMEN SEPARATOR, Dulin, 100 grams Capacity, Hand Driven, designed for field use. Built on the same principle as the larger motor-driven separator No. 1-775. Supplied with directions for operating. **Each, $70.00**

1-795. FILTER PAPER RINGS; for use with Dulin Rotarex Separators.

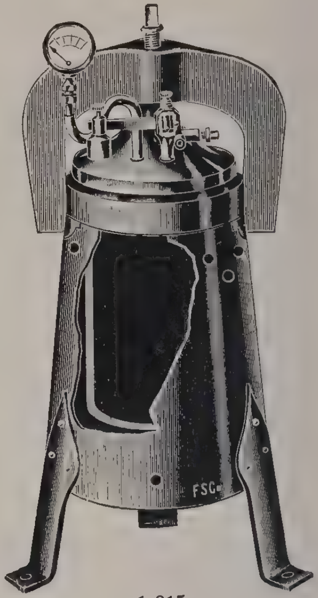
For Separator, capacity, grams	50	100	1000
Per 100 Filters	**$2.25**	**3.00**	**5.50**

Autoclaves



1-800

1-805 1-810



1-815

1-800. AUTOCLAVE-DIGESTER, Type V, Vertical, High Pressure, as used in Organic Research Laboratories; intended for pressures not exceeding 1000 pounds per square inch.

The Retort contains about 500 ml., is heavily constructed of semi-steel, 2¾ inches inside diameter, 5¾ inches deep, with inside bottom rounded to a radius of 1⅜ inches. The Cover is securely clamped in position by five large screws and bolts. In the Cover is a Thermometer Well, ⅜-inch inside diameter and reaching almost to the bottom of the retort. The Safety Valve, set to blow off at 1000 pounds pressure, and a Pressure Gauge, with 3½-inch dial, registering up to 2000 pounds per square inch, are mounted on a Y of heavy wrought iron pipe. The retort rests in a cast iron Draft Shield, supported by three removable cast iron legs, 7½ inches high. The height from the floor to the top of the retort is about 16 inches and the height over all about 30 inches. The autoclave may be heated by a gas burner, or in an oil bath. If an oil bath is used, the retort can be lifted out of the draft shield. Three very short legs are cast on the bottom of the retort to enable it to stand alone. Supplied without gas burner or oil bath.
(*Bunsen Burner No. 4-150 is recommended for use with this autoclave.*) **Each, $95.00**

1-805. AUTOCLAVE-DIGESTER, Type BD-6, Vertical, High Pressure, tested hydraulically to 1000 pounds per square inch. The two handles, conveniently placed, make it easy to move about.

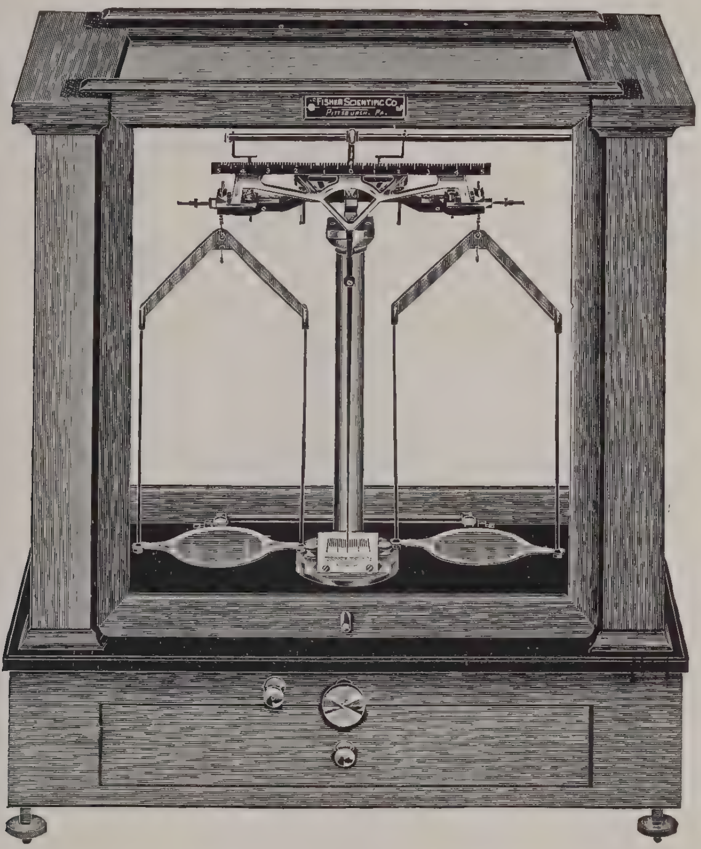
The Retort contains about 1½ gallons; is built of seamless drawn steel $\frac{5}{16}$ inch thick, is 6 inches inside diameter and 12 inches deep, to which is threaded and welded a heavy cast iron collar. The Cover is made with a packing joint and clamped on to the Retort by means of six heavy stud bolts. There is an Auxiliary Safety Valve, for pressures up to 250 pounds per square inch, also a Blow-Off, or Pop Valve, which can be regulated to release at higher pressures up to 1000 pounds per square inch; a Pressure Gauge, reading up to 2000 pounds per square inch, and a Thermometer Well extending within an inch of the bottom of the Retort. The Autoclave is heated by a special Gas Burner, which is supplied with the apparatus. (*Specify the kind of gas to be used.*) A polished steel jacket, used as a Draft Shield, with suitable collar and base for supporting the Autoclave, completes the heating arrangement. **Each, $208.00**

1-811. AUTOCLAVE-DIGESTER, Type BD-10, Vertical, High Pressure, tested hydraulically to 1000 pounds per square inch, similar to No. 1-805, except that the Retort is 10 inches inside diameter, 11 inches deep and contains about 3¾ gallons. **Each, $292.00**

1-815. AUTOCLAVE-DIGESTER, Horseshoe Type, Vertical, Medium High Pressure; built to withstand a working pressure of 350 pounds per square inch, and tested at 450 pounds steam pressure (30 atmospheres).

The Retort contains about 3000 ml., is made of hammered copper, and measures 125 mm. inside diameter, and 250 mm. deep. This is inclosed in a Draft Shield of heavy sheet iron and mounted on three cast iron legs. The Cover is of brass and provided with a thermometer well, pressure gauge, outlet cock for steam and a safety valve, which can be regulated by sliding a weight along the beam. The Safety Valve is arranged so that it automatically shuts off the gas, as soon as the desired pressure, for which it has been set, is obtained. The Pressure Gauge is calibrated in atmospheres (one atmosphere equals 14.71 pounds pressure per square inch, at sea level), and the working pressure is indicated on the dial by red graduations. The Horseshoe Clamp, which is a feature of this autoclave, is made of heavy iron and is used to fasten the cover securely to the Retort. Pressure is exerted upon the cover by means of a large central screw, operated by a suitable wrench. This method of fastening the cover is preferred by some because of its simplicity. The various wrenches are supplied with the autoclave, but not the gas burner.
(*Bunsen Burner No. 4-150 is recommended for use with this autoclave.*) **Each, $110.00**

AUTOCLAVES FOR STERILIZING, See Sterilizers.


FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

1-900

1-900. BALANCE, ANALYTICAL. For precise analytical work, made from designs and specifications which are the result of 20 years' experience. This balance is recommended for work requiring high precision and is being used with satisfaction by many Industrial, Research and University laboratories. It will be noted from the specifications, that this balance has the capacity, sensitiveness and features of more expensive balances.

The Balance Is Guaranteed without Reservation.

Capacity—200 grams in each pan.

Sensitive to $^1/_{20}$ milligram under full load.

Beam—Made of hammered aluminum, 6½ inches long between end knives, finished in **black** and graduated with **50 white graduations** on each side with zero in the middle.

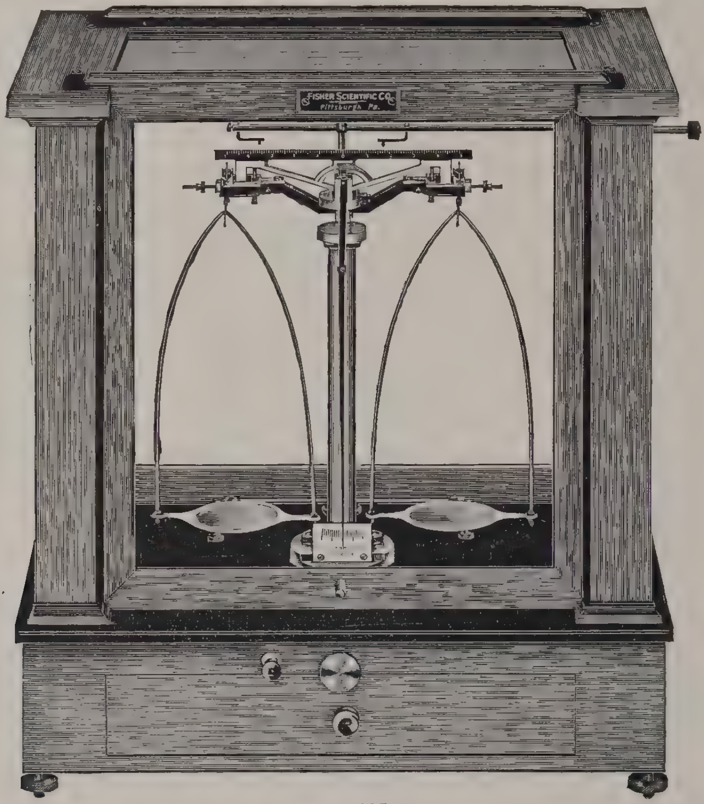
Design—Simplified design, quite substantial, beam-release is the fall-away type with arrests for the stirrups so that the pans do not hang on the knives when not in use. Pan-arrest, operated by push-button, is self-locking.

Hangers and Pans are of aluminum; hangers are 4 inches wide at the pans and have straight sides to take large absorption bulbs and are constructed to eliminate springing.

Bearings are **Agate Planes** and the **Knife Edges** are also of **agate.**

Case—Seasoned mahogany, highly polished, 16½ inches wide, 18 inches high, 9½ inches deep; with counterpoised front door, removable rear door and leveling feet. **Base is covered with heavy black glass plate,** and provided with drawer for weights.

Price with two 5 milligram riders, but without weights, $125.00


FISHER SCIENTIFIC CO.
Pittsburgh Pa.

1-905

1-905. BALANCE, ANALYTICAL. A medium priced, quick-acting balance for analytical work in Educational and Industrial laboratories, made according to designs and specifications to meet the demand of those not requiring the more expensive types. A large number of these balances are in use and are considered to be excellent balances for the price.

Capacity—200 grams in each pan.

Sensitive to $^1/_{20}$ milligram with 100 gram load and $^1/_{10}$ milligram with 200 gram load.

Beam—Made of hammered aluminum, 6 inches long between end knives, finished in **black,** graduated with **50 white graduations** on each side, with zero in the middle. Using a 5 milligram rider, each division represents $^1/_{10}$ milligram.

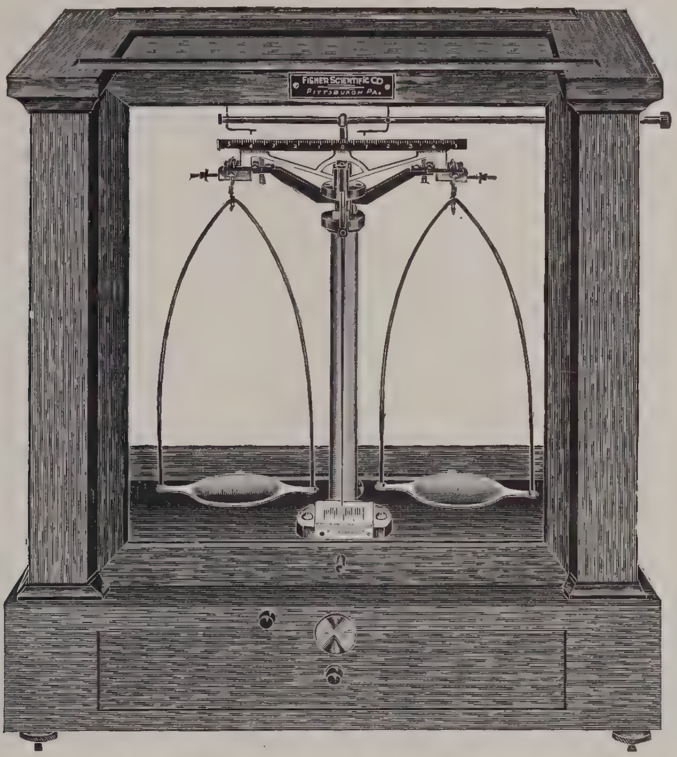
Design—Simplified fall-away type of release for beam, with arrests to hold the stirrups off the knives when not in use. Release is operated by key in the front of the base. Separate pan-arrest is self-locking and is operated by push-button. All metal parts are polished and are finished with baked lacquer which protects them from corrosion.

Hangers and Pans of aluminum, bows are 4⅛ inches wide; pans are 2⅝ inches diameter.

Bearings and Knife Edges are **agate.**

Case—Seasoned mahogany, 16½ inches wide, 18 inches high, 9½ inches deep, with counterpoised door in front and removable door in rear, drawer and adjustable leveling feet. Has **heavy black glass plate base.**

Price with two 5 milligram riders, but without weights, $100.00



1-910

1-910. BALANCE, ANALYTICAL. An inexpensive analytical balance used extensively for students' work and for Industrial laboratory work. In many instances where an expensive analytical balance is available, this balance is used as a second balance. It is often used for a routine analysis where the precision of a more expensive balance is not required.

Capacity—100 grams in each pan.

Sensitive to $^1/_{10}$ milligram.

Beam—Made of hammered aluminum, 6 inches long between end knives, finished in **black, with 50 white graduations** on each side, with zero in the middle. Using a 5 milligram rider, each division equals $^1/_{10}$ milligram.

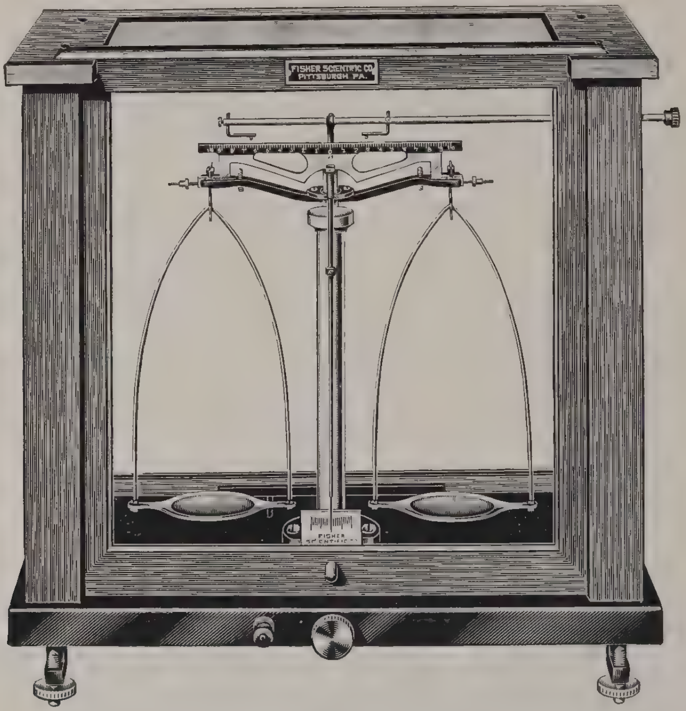
Design—Releasing mechanism is the fall-away type which is operated by a detachable key in the front of the base. The arrest extends to the stirrups and supports them when the balance is not in use, so that they do not rest on their knives. Stirrups are nickel-silver with agate bearings, and are controlled by a centering device. Separate pan-arrest is operated by a push-button.

Hangers and Pans—Bows are 4 inches wide at the pans, and the pans are 2⅝ inches diameter.

Bearings and Knife Edges are **agate.**

Case—Polished mahogany with counterpoised front door and removable rear door; adjustable leveling feet; drawer for weights. Dimensions, 16½ inches wide, 18 inches high, 9½ inches deep.

Price with two 5 milligram riders, but without weights, $80.00


FISHER SCIENTIFIC CO.
PITTSBURGH PA.
FISHER SCIENTIFIC

1-915

1-915. BALANCE, STUDENTS' ANALYTICAL. An inexpensive analytical balance made according to our own specifications, especially to meet the requirements of students' work. It has many features which add to its utilitarian value, but on account of its popularity and the number of balances made, they are made more efficiently and sold at a very moderate price.

The features embodied in this balance which are not duplicated in other balances of this price, are large size case, sensitiveness, full agate bearings, self-centering beam graduated on both sides, and the reinforced, black base.

Capacity—200 grams in each pan.

Sensitive to $^1/_{10}$ milligram.

Beam—Made of hammered aluminum, 6½ inches long between the end knives; finished in **black** with **50 white graduations on each side,** numbered up to 10, with zero in the centre. **This is a great convenience,** saves time, and simplifies weighing because the rider weights can be added to or subtracted from the separate weights on the pan, and avoids the necessity of changing weights every time they are slightly overweight as must be done where the beam is graduated on one side only.

Using a 10 milligram rider, the numbers on both sides of the beam read directly in milligrams and each subdivision is $^1/_5$ of one milligram.

Design—Very substantial and simple so that it does not require the extremely careful handling of more elaborate balances. The beam-support has two arms which lift the stirrups off their knives when the beam is lifted off the main bearing. These supports fall away when the beam is released.

The bearing-mountings and the beam-arrest are so constructed that the beam is automatically centered when the arrest is raised and thus the beam always swings in the same position when the arrest is released. **This assures a constant zero point.**

The pan-arrest operates separately by a push-button in the front, which is locked by a slight turn. All parts are lacquered to prevent corrosion.

Bearings and Knives are of **agate.**

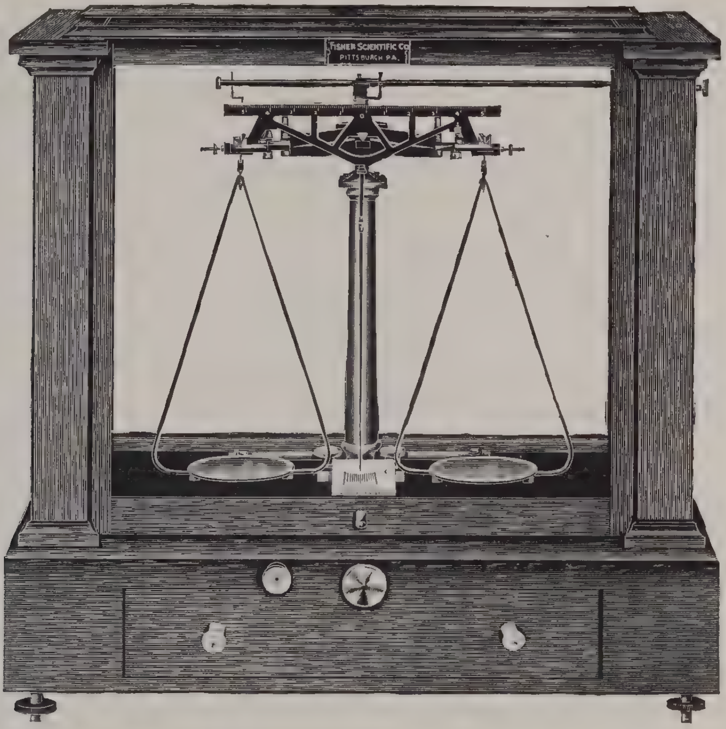
Hangers and Pans—Bows are 4¼ inches wide at the pans. Pans are aluminum, 2½ inches diameter.

Base is finished in **black** which makes a good background for viewing the small weights and is more serviceable than the wood colors because it is not so readily stained by the chemicals which might be spilled. **It is reinforced** with two metal braces on the bottom, one on each side extending the full depth of the base. The wooden base is held with screws spaced along these metal braces so that warping of base is prevented. The leveling feet are attached to the front of the metal reinforcements and thus these metal supports carry the entire weight of the balance.

Case—Seasoned hardwood, finished in light mahogany, rubbed and polished. With counterpoised front door; glass on four sides and the top. Size, 16½ inches wide by 15 inches high by 9½ inches deep. Provided with circular level and adjustable leveling feet.

Price with two 10 milligram riders, but without weights, $50.00

Suitable but less expensive weights for use with this balance are listed under No. 2-265 on page 58.



1-920

1-920. BALANCE, ANALYTICAL, TROEMNER'S No. 10. The balance which we have supplied to industrial laboratories for over twenty years. A great many of these balances are in use in laboratories in and about Pittsburgh where they are used night and day and have given long and favorable service.

Capacity—200 grams.

Sensitive to $^{1}/_{20}$ milligram.

All brass parts of this balance are gold plated.

Beam—7 inches long, of cold rolled aluminum alloy, oxidized black and divided into 50 white divisions on each side of the center.

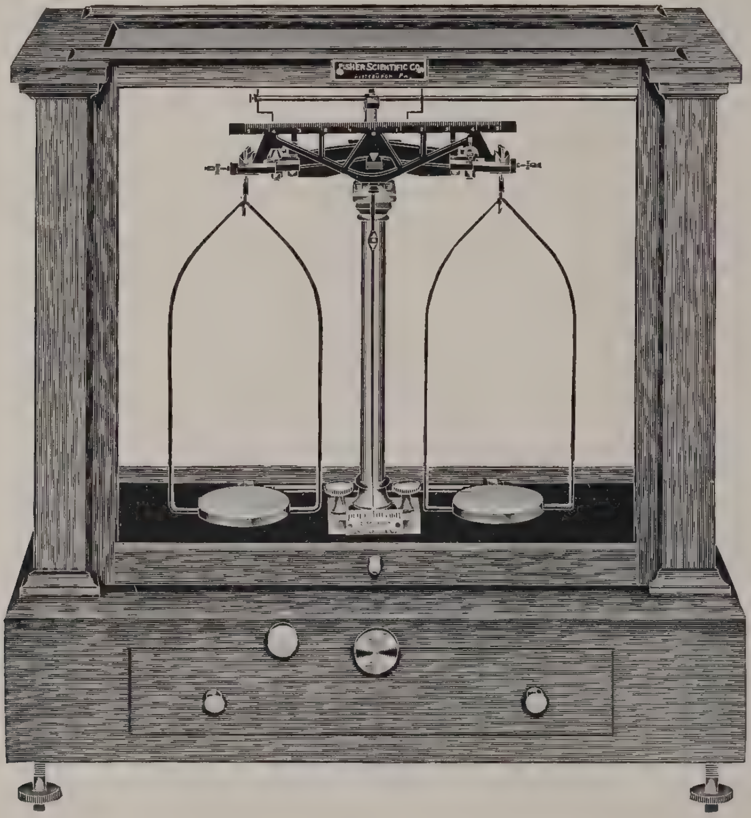
Design—Release arms made of three principal parts, so constructed as to bring their axes coincident with the contact line at the center knife-edge and hold the beam firm when loading or unloading the balance. Has separate pan-release; two vial shaped levels and double rider carrier.

Bearings—All knives and planes are of agate.

Hangers and Pans—Pans are of aluminum, 3 inches diameter; arches are of cold drawn nickel-silver, gold plated.

Case—Large size, of old mahogany, French polished, base covered with **heavy black glass plate,** door counterpoised, rear sash can be removed. Width 19 inches, height 19 inches, depth 11 inches; provided with drawer for weights.

Price with three 5 milligram riders, but without weights, $219.60


FISHER SCIENTIFIC CO.
PITTSBURGH PA.

1-925

1-925. BALANCE, ANALYTICAL, TROEMNER'S No. 11 A. After the No. 1-920, this is the Troemner balance which we have found most popular for precise work. The mechanism is the same as the No. 1-920, but the bows are wider at the middle and the metal parts of this balance are lacquered brass.

Capacity—200 grams.

Sensitive to $^1/_{20}$ milligram.

Beam—Cold rolled aluminum alloy, 7 inches long, oxidized black with 50 white graduations on each side of the center.

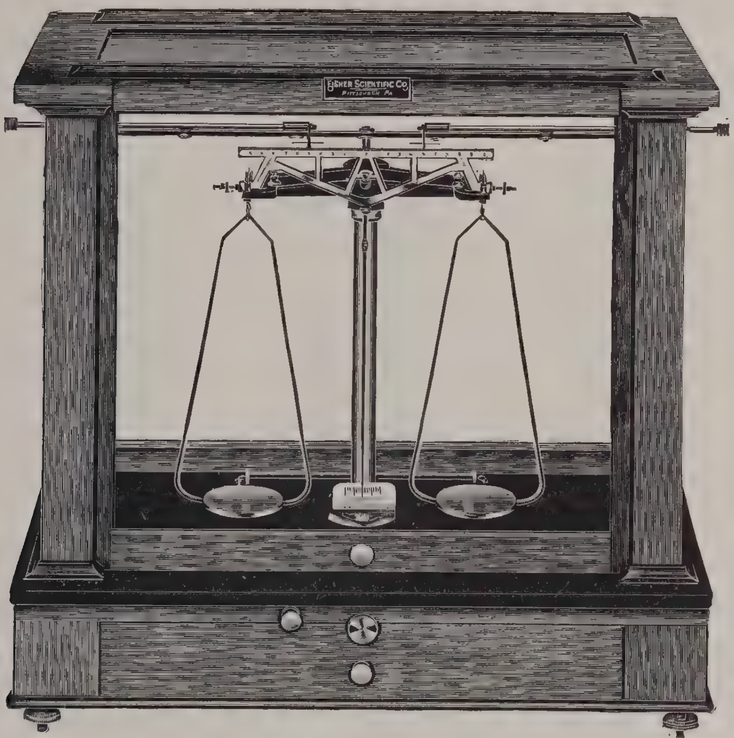
Bearings and Knife Edges are of agate.

Design—Releasing mechanism raises the beam and stirrups just enough to remove the load from the edges. The axis of the swinging arm is always coincident with the contact line at the center knife-edges. Pan-arrests are self-locking. Is provided with two vial shaped levels and double rider carrier.

Hangers and Pans—Pans are of nickel-silver, 2½ inches diameter; arches are nickel-silver wire, 4 inches wide and 8½ inches high.

Case—Old mahogany, French polished with **heavy black glass base.** Sliding front and rear doors; front door counterpoised; width 19 inches, height 19 inches, depth 11 inches.

Price with two 5 milligram riders, but without weights, $178.20


FISHER SCIENTIFIC CO.
PITTSBURGH PA.

1-930

1-930. BALANCE, ANALYTICAL, AINSWORTH. This balance is similar to the No. 1-920 balance, and is made for us by Ainsworth, the Western firm that makes the precise assay balances. We have sold many of these during the last seven years, and have continued it as a standard stock article because of the satisfactory reports received from the users.

Capacity—200 grams.

Sensitive to $^{1}/_{20}$ milligram under full load.

The **column** and other **brass parts** are **gold plated** to resist corrosion.

Beam—Hard rolled aluminum, 7 inches long and graduated with 100 divisions on each side of the center. Each division represents $^{1}/_{10}$ milligram, using the 10 milligram riders.

Bearings—All knives are of agate. The main knife is set rigidly in the beam, a method which insures permanent adjustment. All bearings are agate planes.

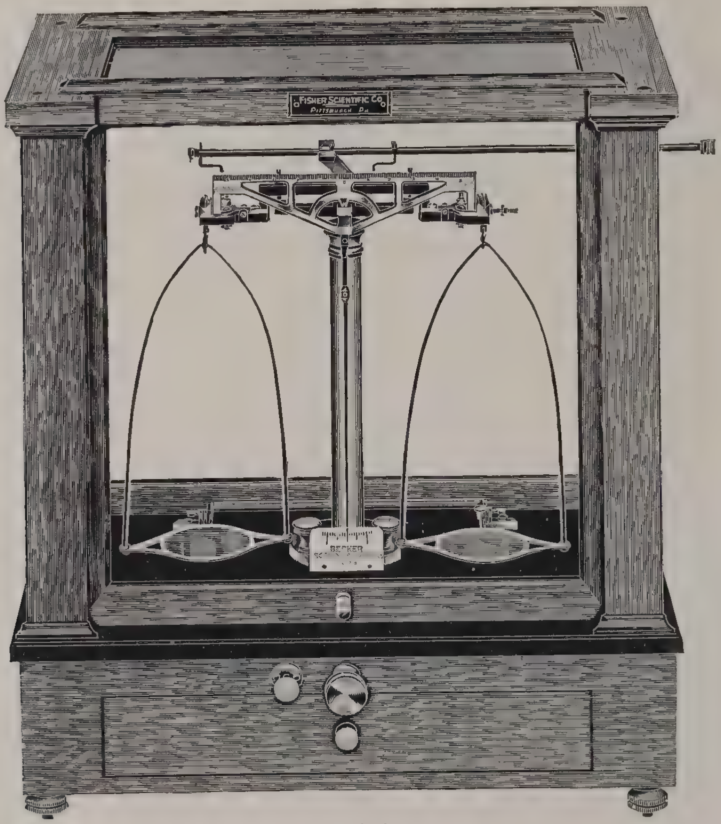
Design—Releasing mechanism has its axis coincident with the contact line of the center knife edge.

Hangers are of skeleton design to take the removable flat metal pans or the concave nickel-plated pans with handles, both of which are furnished with the balance. Base of column has two vial shaped levels.

Rider Carriers—There are two rider carriers, one on each side, of the improved design used on the fine assay balances. These permit the rapid handling of the riders without the liability of their falling from the carrier or the beam. They are provided with stops, one at the correct height over the beam to pick up the rider, the other at the top of the lift movement.

Case—Large size, of old mahogany, French polished, with counterpoised front door and sliding rear door, with drawer for weights, **heavy black glass base** and adjustable leveling feet. Size, 20 inches wide, 18 inches high, 10 inches deep.

Price with two 10 milligram riders, but without weights, $180.00


FISHER SCIENTIFIC CO.
PITTSBURGH, PA.
BECKER

1-935

1-935. BALANCE, ANALYTICAL, BECKER'S. Although this balance is often referred to as the "Dutch" type, it was brought out in 1886 by Becker Bros., U. S. A., and was copied in Holland. It was one of the early short-beam balances, and it has maintained its popularity. At present, this balance is being used in laboratories in different countries all over the world.

Capacity—200 grams.

Sensitive to $^1/_{20}$ milligram under full load.

Beam—Made of a special aluminum alloy which is quite strong; it is 7 inches long and is graduated with 55 divisions on each side of the center. Using a 6 milligram rider, each division on the beam equals $^1/_{10}$ milligram.

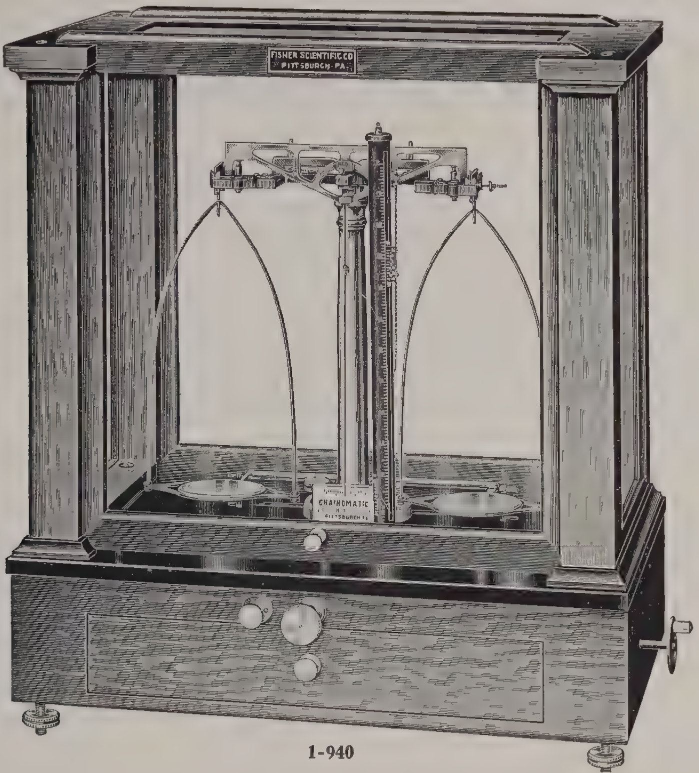
Design—Releasing mechanism moves through the same arc as the beam, avoiding shifting of the beam; separate pan-arrest with locking device; double rider carrier.

Hangers and Pans are of nickel-silver. Pans are 2½ inches diameter and the bows are 4 inches wide at the pans.

Bearings—All the knives are of agate and the planes on which they rest are also of agate.

Case—Polished mahogany with glass sides and top; with counterpoised front door and removable rear door. The entire base is protected by **heavy black glass plate.** Width, 16½ inches, height, 18½ inches, depth, 9¼ inches; provided with leveling feet and drawer for weights; an aluminum bench, for use in making specific gravity determinations, is supplied.

Price with three 6 milligram riders, but without weights, $150.00


FISHER SCIENTIFIC CO
PITTSBURGH, PA.
CHAINOMATIC
PITTSBURGH PA.

1-940

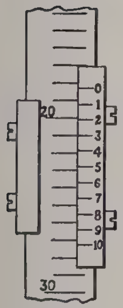


Fig. 1

CHAINOMATIC BALANCES

The use of a chain on an analytical balance, instead of the small fractional weights and riders, is a new feature.

One end of the chain is attached to the beam and the other end to a block which can be moved up or down the shaft in which it slides.

This block is raised and lowered by means of a crank on the right side of the case, and as it is lowered, the weight of the chain is transferred to the beam.

The block carries a vernier and the shaft is graduated from zero to 100 milligrams, showing the weight of the chain which has been transferred to the beam with the block in different positions. Weighings of $^{1}/_{10}$ milligram to 100 milligrams are made by adjusting the chain and reading the graduated scale and vernier.

Fig. 1 shows the scale and vernier when the weight of the chain on the beam is 18.3 milligrams.

The chain weight can be adjusted while the beam is swinging and the case closed, thereby saving time and the handling of small weights.

1-940. BALANCE, CHAINOMATIC, ANALYTICAL. This is the No. 1-935 balance, the old standard model, equipped with the new chain-weighing arrangement described above, under "Chainomatic Balances."

Capacity—200 grams.

Sensitive to $^{1}/_{20}$ milligrams under full load.

Beam—7 inches long, made of a special aluminum alloy and is not graduated as the chain avoids the use of riders.

Chain Column—Graduated to 100 milligrams and with the vernier, can be read to $^{1}/_{10}$ milligram, so that all weighings from 100 milligrams down to $^{1}/_{10}$ milligram are made by adjusting the chain by means of the crank on the right side of the case.

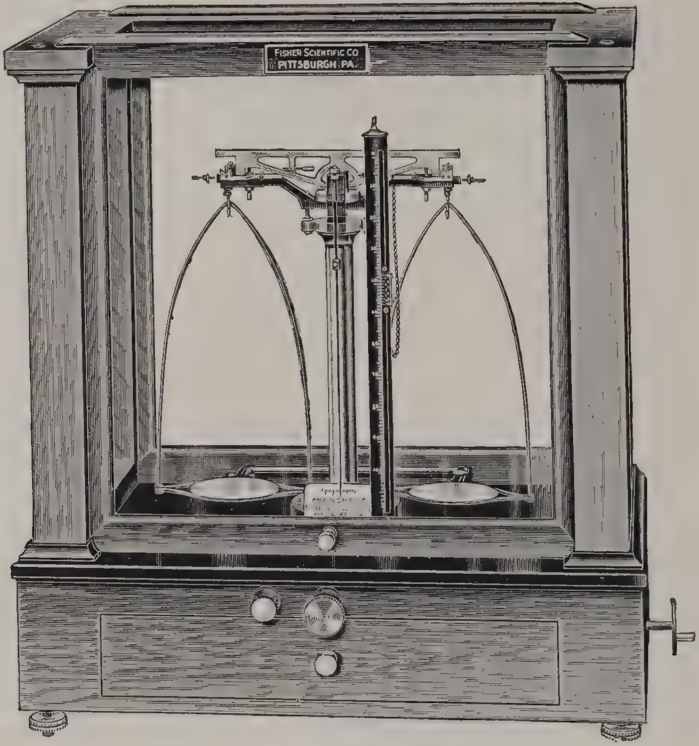
Design—Releasing mechanism moves through the same arc as the beam. Separate pan-arrest has locking device.

Hangers and Pans—Pans are nickel-silver, 2½ inches diameter, and bows are 4 inches wide at the pans.

Bearings—All the knives are of agate and the planes on which they rest are also agate.

Case—Polished mahogany with glass sides and top; base is protected by **heavy black glass plate.** Width, 16½ inches, height, 18½ inches, depth, 9¼ inches; provided with leveling feet.

Price, without weights, $190.00



1-945
See also No. 1-950

1-945 **BALANCE, CHAINOMATIC, ANALYTICAL.** This balance is popular for routine work; it is not quite as sensitive as the No. 1-940 Chainomatic Balance, but sufficiently so for most routine work. For general description of the chain-weighing arrangement, see "Chainomatic Balances," just preceding No. 1-940.

Capacity—200 grams.

Sensitive to $^1/_{10}$ milligram under 200 gram load and $^1/_{20}$ milligram under 100 gram load.

Beam—Aluminum alloy, 6 inches long, not graduated as the chain avoids the use of riders.

Chain Column—Graduated to 100 milligrams and with the vernier, can be read to $^1/_{10}$ milligram, so that all weighings from 100 milligrams down to $^1/_{10}$ milligram are made by adjusting the chain by means of the crank on the right side of the case.

Design—Simple type releasing mechanism, separate pan-arrest with locking device.

Bearings—All knives and planes are of agate.

Pans and Hangers—Pans are of nickel-silver, 2½ inches diameter, and bows are 4 inches wide at the pans.

Case—Made of polished mahogany, with glass top and sides, with counterpoised front door and removable rear door. Width, 16½ inches, height, 18½ inches, depth, 9¼ inches. **Base is protected by heavy black glass plate;** equipped with leveling feet; provided with a drawer for weights.

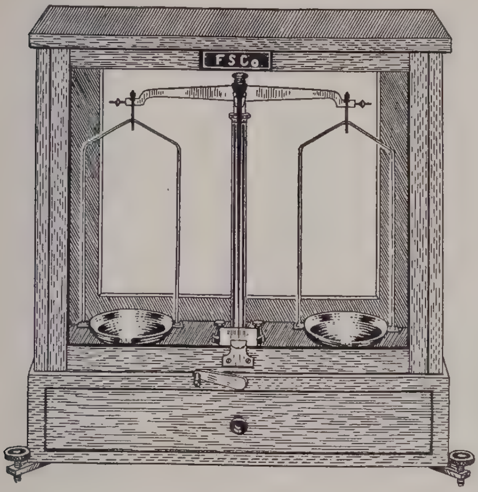
Price, without weights, $150.00

1-950. **BALANCE, CHAINOMATIC, ANALYTICAL, with Rider.** This balance is the same as No. 1-945, except that it **has a graduated beam** and a **rider carrier,** in addition to the chainomatic arrangement.

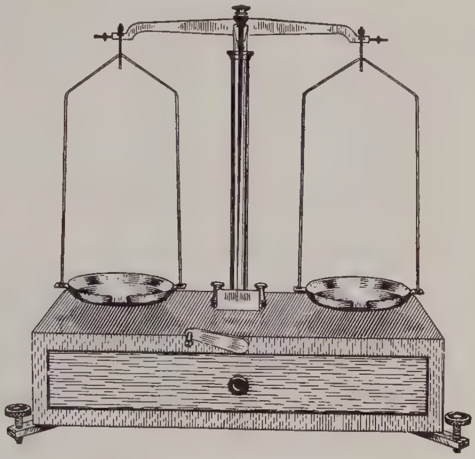
Beam is graduated on both sides, 0 to 1 gram, in 100 mg. divisions; a special rider-weight is supplied with the balance.

No Fractional Weights are required. With this balance, weighings from $^1/_{10}$ mg. up to 100 mg. are made with the chain, and weighings from 100 mg. to 1 gram are made with the rider.

This enables weighings from $^1/_{10}$ mg. up to 1.100 grams to be made without any separate weights, **thereby doing away with fractional weights entirely.** **Price, without separate weights, $170.00**



1-955 1-960 1-965



1-970 1-975 1-980

1-955. BALANCE, GENERAL LABORATORY, with CASE. A complete and inexpensive balance, which will serve for many different small weighings in the laboratory, such as dispensing samples, prescriptions, ore, sugar, pulp, gold, silver, etc. The use of this balance, where possible, saves the analytical balance. Balance has lacquered brass beam and column, brass bows, removable nickel-plated pans and the three **bearings** on which the knives rest are made of **agate.** Case of polished hardwood with glass on four sides, front door is counterpoised; equipped with adjustable leveling feet, provided with a drawer for weights. Pans 2¾ inches diameter. Case 14 inches wide.

Capacity—100 grams.

Sensitive to 1 milligram. **Price, without weights, $35.00**

1-960. BALANCE, GENERAL LABORATORY, with CASE, of the same design and construction as No.1-955 but a larger size. Pans 3¼ inches diameter. Case 15 inches wide.

Capacity—200 grams.

Sensitive to 2 milligrams. **Price, without weights, $40.00**

1-965. BALANCE, GENERAL LABORATORY, with CASE, of the same design and construction as No. 1-955 but larger size. Pans 3¾ inches diameter. Case 18 inches wide.

Capacity—300 grams.

Sensitive to 5 milligrams. **Price, without weights, $53.00**

1-970. BALANCE, GENERAL LABORATORY. This is the same balance as No. 1-955 except that it is not enclosed in a case. Its uses are the same as those mentioned under No. 1-955, and the specifications, with the exception of the case, are the same as given under No. 1-955. The base of this balance is a polished hardwood box, fitted with drawer for weights and provided with levelling feet. Pans 2¾ inches diameter.

Capacity, 100 grams.

Sensitive to 1 milligram. **Price, without weights, $22.00**

1-975. BALANCE, GENERAL LABORATORY, of the same design and construction as No. 1-970 but a larger size. Pans 3¼ inches diameter.

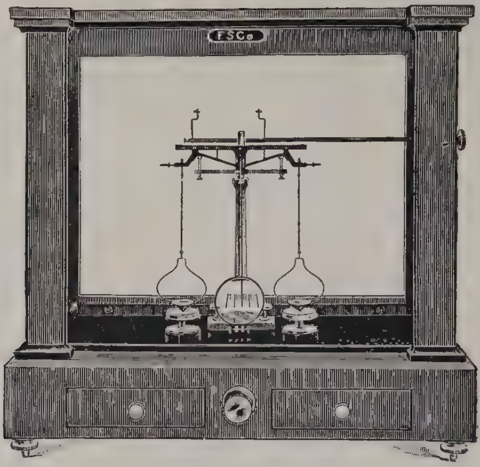
Capacity, 200 grams.

Sensitive to 2 milligrams. **Price, without weights, $26.50**

1-980. BALANCE, GENERAL LABORATORY, of same design and construction as No. 1-970 but a larger size. Pans 3¾ inches diameter.

Capacity, 300 grams.

Sensitive to 5 milligrams. **Price, without weights, $35.00**



1-985

1-985. BALANCE, ASSAY, TROEMNER, NEW. This is a new assay balance developed to meet the demand for a moderate priced assay balance which would be quick acting and sensitive to $^1/_{100}$ milligram.

Sensitive to $^1/_{100}$ milligram.

Beam—Hard rolled aluminum, graduated in 50 divisions on each side of the center. A 1-mg. rider on one-half divisions will show $^1/_{100}$ milligram for each division on the needle index.

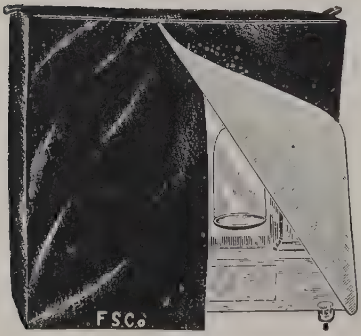
Design—Balance has fall-away release and separate pan-arrest and is provided with a reading glass for the ivory index.

Bearings—Bearings and knife edges are of agate.

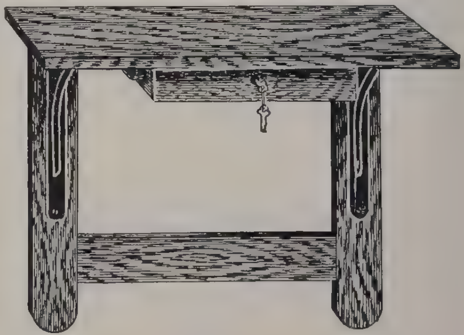
Pans are of aluminum; hangers of cold-drawn nickel-silver wire.

Case—Seasoned mahogany, equipped with rider carrier; with counterpoised front door. Width, 18 inches, height, 18 inches, depth, 9½ inches.

Price, without weights, $217.80



1-990

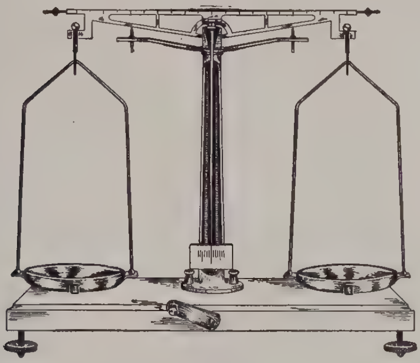


1-995

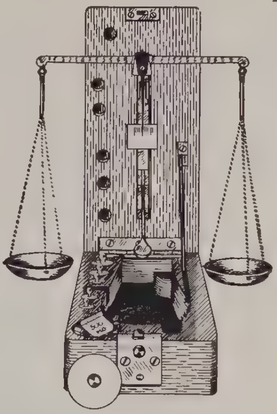
1-990. BALANCE COVERS of rubberized cloth. A very good means of protecting analytical balances. Size A fits balances Nos. 1-900, 1-905, 1-910, 1-935, 1-940, 1-945 and 1-950. Size B fits balances Nos. 1-920 and 1-925. Covers of any other sizes will be made at the same price. When ordering sizes other than those listed, specify the extreme dimensions of the top of the case, also the height.

Size A, for balance 16½x 9½x18½ inches high, $2.75
Size B, for balance 19 x11 x19 inches high, $3.00

1-995. BALANCE TABLE, WALL TYPE. A table to support a balance, which can be attached to the wall, thereby eliminating the vibrations to which most floors are subject. Made of heavy oak, stained and varnished. Provided with a drawer for weights and other small and valuable articles, equipped with lock and two keys. Size of top, 18 by 24 inches. **Each, $14.00**



2-000



2-005 2-010

2-000. BALANCE, ALUMINUM. This entire balance, including the base, pillar, beam, hangers and pans, is made of an aluminum alloy, which is very resistant to the corrosive action of laboratory fumes. The **bearings** are made of agate, and the **knife edges** are also **agate.** A graduated beam permits the use of the rider, supplied with the balance, and eliminates the handling of small weights. This is a very good balance for students' use. Made in two sizes.

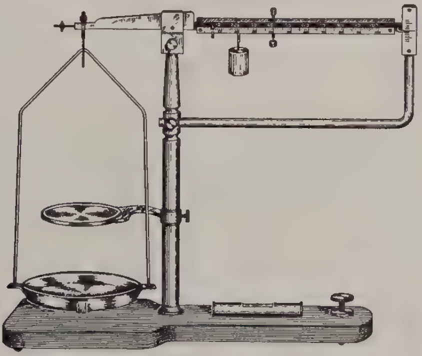
SIZE	A	B
Capacity, grams	125	250
Sensitive to, milligrams	2	5
Price, without weights	**$27.00**	**30.00**

2-005. BALANCE, POCKET, METRIC. A very convenient and compact balance, in polished mahogany case which measures 6x3x1½ inches when closed, and can be carried in the coat pocket.

When in use, the lid serves as the support for the beam. The beam is 5 inches long; the pans are 1⅝ inches diameter; the capacity is 10 grams and the sensitiveness is ¼ milligram.

A set of weights 10 grams to 1 milligram is contained in the case. **Price, with weights, $18.00**

2-010. BALANCE, POCKET, ASSAY. Similar to No. 2-005, but with a one-half assay-ton weight instead of the 10-gram weight. This balance serves as a pulp scale or for assaying, where ¼ milligram is sufficiently sensitive. **Price, with weights, $18.00**

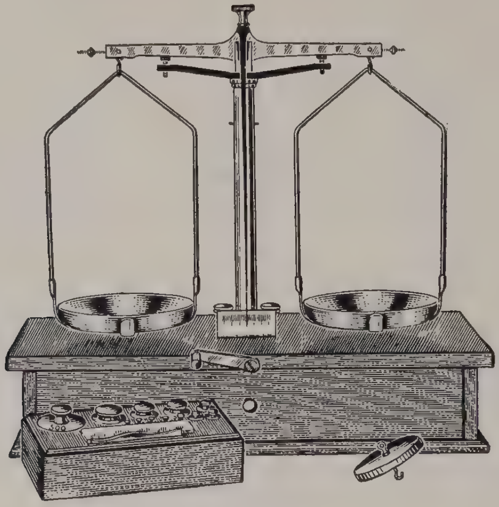


2-015

2-015. BALANCE, TRIPLE BEAM. For physical and chemical laboratories. The three beams are placed in the same horizontal plane, thus conforming to scientific principles involved. Weighings are obtained by movement of the riders along the beams. These riders are easily handled and quickly placed in the notches, but cannot be removed from the beams. An adjustable support is provided for a jar or other receptacle, for experiments in specific gravity. Provided with stable base and with sensitive spirit level and leveling screw. Balance neatly finished in nickel plate. Capacity of middle beam, 100 grams by 10 gram divisions; back beam, 10 grams by 1 gram divisions; front beam, 100 centigrams by 1 centigram divisions. Total capacity, 111 grams; sensibility, 1 centigram. Diameter of pan, 95 millimeters; width of bow, 105 millimeters; height of bow, 220 millimeters. Features easily recognized are: rapid weighing, constant sensitivity, accuracy, freedom from loss of weights, no interference or breaking of weights. **Price, with weights, $17.50**

(For weighing up to 200 grams; see weight No. 2-020.)

2-020. WEIGHT, Extra, with hook, for use with No. 2-015 Balance for weighing over 111 grams, but not to exceed 201 grams. Weight must be used only on the 100-gram notch of the middle beam. **Weight only, $1.50**



2-025

2-025. BALANCE, GENERAL LABORATORY AND HYDROSTATIC. This balance has a capacity of **1 kilo** in each pan and is **sensitive to 10 milligrams**; the beam is brass and is 10 inches long from hanger to hanger and has balancing screws on both ends; the bows are brass and the pans are polished brass, 5½ inches diameter and are removable.

The pillar is 11 inches high to the beam and is polished, lacquered brass; the indicator is black and the index is white with 15 black graduations on each side.

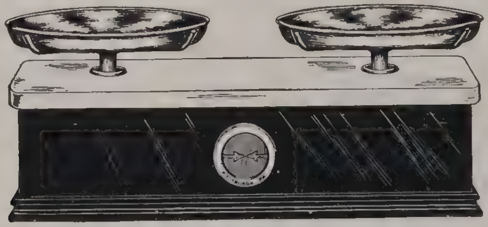
The base is polished mahogany, 18 inches wide, 9 inches deep and 4 inches high and has a drawer.

The beam is lifted from the rest, by means of the crank in front.

To use as a **hydrostatic balance,** remove one pan and its hanger and replace it with the counterpoised weight with hook.

A set of weights, from 500 grams to 10 milligrams, is supplied with the balance; the gram weights are brass and the fractions are aluminum and nickel-silver. Set is contained in a polished wooden block with the fractions under a glass plate; a brass forcep is included.

Price, with set of weights, $45.00



2-030

2-030. BALANCE, MARBLE TOP, DISPENSING. A very convenient balance for dispensing, etc., and one which adds to the appearance of the laboratory.

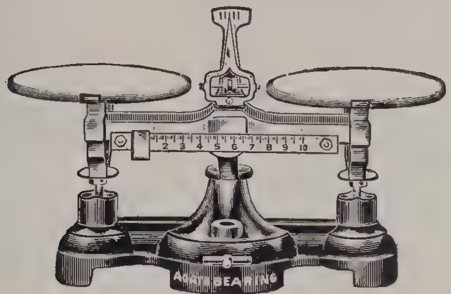
The entire mechanism is enclosed in a wooden case which is finished in black; the marble top is ¾ inch thick and is white. The pans are heavily nickel plated, and are removable. There are two indicators in the front of the balance, which are protected by a glass plate. This balance is made in three sizes.

SIZE	A	B	C
Capacity, pounds	5	15	25
Diameter pans, inches	7	8	9
Price, without weights	**$27.00**	**30.00**	**34.00**

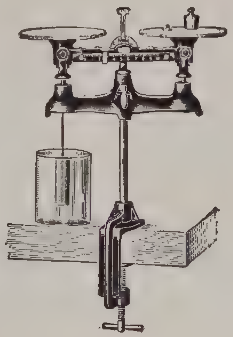
BALANCES FOR ROUTINE WORK

Most of the balances described are for general work in the laboratory. Special balances designed to facilitate routine weighing and calculating in different industries are too numerous to be described here.

Some of such balances are for druggists, photographers, bankers, jewelers, assayers, dairy products, cotton and woolen fabrics, yarns, silks, seeds, grain, sand, paper, solder, etc. Those having work requiring a large number of routine weighings and calculations should write us for a special balance to simplify the work.



2-035



2-040

2-035. BALANCE, HARVARD TRIP, AGATE BEARINGS. This balance **with agate bearings** is offered at the same price as the old style balance with steel bearings.

This balance is made of steel and brass parts, accurately formed by special tools; the base is an iron casting. There are hardened steel prism-shaped knives, and each rests on a V-shaped agate bearing. This insures high initial sensitiveness and a continuation of it with use.

Pans are flat, with glass plates, 140 millimeters diameter. Beam, with sliding weight, weighs 10 grams and is divided in $^{1}/_{10}$ gram divisions. Balance adjusting screw is mounted in lower part of the indicator.

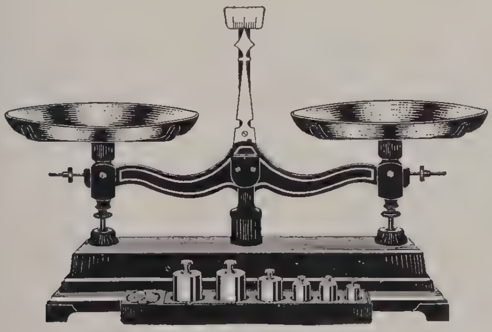
Under the base there are hooks located directly beneath each pan-bearing, from which objects may be suspended for specific gravity determinations.

An opening to take a 13 millimeter rod is provided in the base and a set-screw enables the balance to be attached to such a rod. (See No. 2-040.)

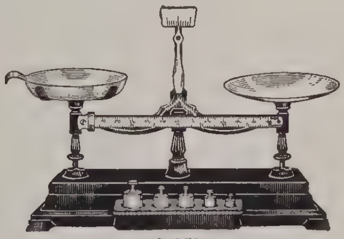
Capacity, 2 kilos. **Sensitive** to $^{1}/_{10}$ gram. **Price, without support or weights, $10.00**

2-040. SUPPORT only, for No. 2-035 BALANCE, to elevate it from table. Clamp will fit a table-top 100 millimeters thick or less, and the rod is 200 millimeters long by 13 millimeters diameter and is nickel plated.

Support, without balance, $1.50



2-045



2-050

2-045. BALANCE, LABORATORY, METRIC. Specially designed for dispensing in the laboratory. This balance is rugged and will weigh to $^{1}/_{10}$ gram. The base and the weight-shelf is made of one iron casting, painted and trimmed; the **pans** are **6 inches** diameter, nickel plated, and are removable. A shelf in front holds the set of weights, two 100 grams down to 100 milligrams. Accurate weighing is facilitated by an upright indicator and a celluloid index plate which has five divisions on each side of the center. Equipped with balancing screws on each side.

Capacity, 325 grams. **Sensitive** to $^{1}/_{10}$ gram. **Price, with weights, $18.75**

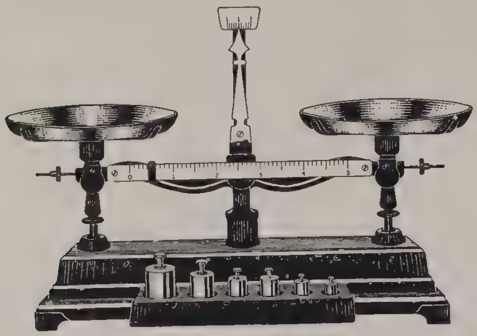
2-050. BALANCE, SMALL DISPENSING, METRIC. For dispensing small quantities in the laboratory, or for pharmaceutical work. The base and weight-shelf is made of one iron casting, painted and trimmed. The pans are nickel plated; the weight pan on the right is slightly concave, and is 4 inches in diameter, while the chemical pan on the left is 3½ inches diameter, has a handle, and is removable.

The beam has two scales for the same rider-weight; the upper one is 120 grains (2 drachms) in 1 grain divisions, and the lower one is 8 grams in $^{1}/_{10}$ gram divisions.

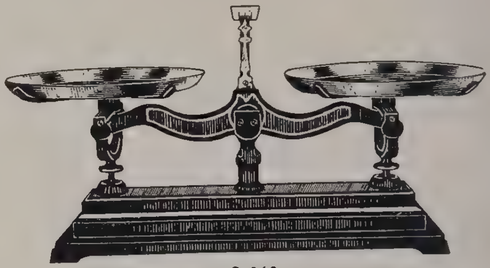
Brass weights from 50 grams to 5 grams are held in the weight-shelf.

Accurate weighing is facilitated by an upright indicator and a celluloid index plate, which has five divisions on each side of the center.

Capacity, 110 grams. **Sensitive** to $^{1}/_{10}$ gram. **Price, with weights, $16.50**



2-055



2-060

2-055. BALANCE, DISPENSING, METRIC. For laboratory dispensing. The base and weight-shelf are made of one iron casting, painted and trimmed; the **pans** are nickel plated, **5 inches** diameter, and are removable.

The beam is graduated to 5 grams in $^{1}/_{10}$ gram divisions. Brass weights from 100 grams to 5 grams are held in the weight-shelf.

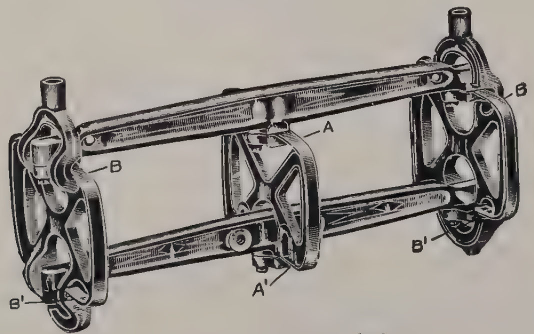
Equipped with balancing screws on each side.

Accurate weighing is facilitated by an upright indicator and a celluloid index plate graduated in 5 divisions on each side of the center.

Capacity, 225 grams. **Sensitive** to $^{1}/_{10}$ gram. **Price, with weights, $19.75**

2-060. BALANCE, ROBERVAHL. An inexpensive balance for coarse weighing; heavy brass pans 9 inches diameter. Upright indicator and celluloid index plate.

Capacity, 5 pounds. **Sensitive** to 20 grams. **Price, without weights, $17.75**



See No. 2-065 to No. 2-085 inclusive.

BALANCES, TORSION—General Description

The Torsion Balance is constructed in an unusual manner. The ordinary balance has a knife-edge fulcrum, while the Torsion Balance uses steel bands instead.

The pans are carried by two beams, one above the other, and each pan is suspended by two steel bands. The beams are in turn suspended by two steel bands in the center.

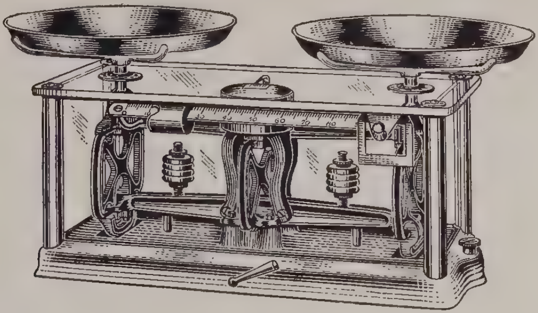
A and A′ are the steel bands which support the beams; B and B′ the steel bands which support the pans.

As the beam tips, the steel bands are twisted and the force of the torsion works in opposition to the force of gravity. This makes a quick-acting, sensitive and accurate balance and, with no knife edges to dull, it preserves its initial sensitiveness for a long period. A beam-arrest takes the load off the steel bands when the balance is not in use.

The Torsion Balances listed are those used for general laboratory work.

In addition to the balances listed, we can supply Torsion Balances designed for special work, such as prescription, seed weighing, moisture in butter and cheese, milk and cream testing, ice cream testing, grain and rice testing, ascertaining the weights per yard of cotton or woollen fabrics, etc.

Advise us the particular purpose for which you require a balance and we will send an illustration, description and price of a balance to fulfill that purpose.



2-065

2-065. BALANCE, TORSION, LARGE, in glass case. This balance has a large carrying capacity (4½ kilos), and is at the same time quite sensitive (⅕ gram). It is used in the college and industrial laboratories for work requiring large capacity and accuracy.

The entire mechanism is nickel plated and is enclosed in a plate glass case having a nickel plated metal base, and nickel plated corner columns. The pans are brass, nickel plated, 9 inches diameter, and are removable.

The beam (inside the case) has a scale graduated to read to 100 grams in 1 gram divisions, and the sliding weight is operated from outside the case.

The beam-arrest is operated by a lever outside the case; this enables quick weighing and supports, the weight of the beam when the balance is not in use.

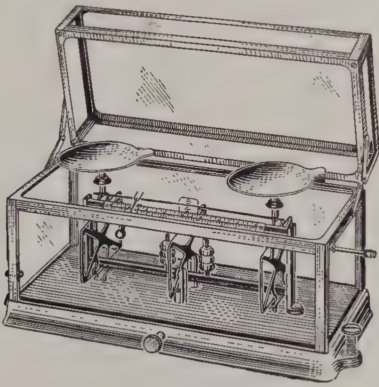
Accurate weighing is facilitated by a stationary indicator and a white index plate on the beam graduated with 5 divisions on each side of the center.

(See also, general description of Torsion Balances, just preceding.)

Dimensions of glass case—16 inches by 7½ inches by 7½ inches. Length of beam, 12 inches.

Capacity, 4½ kilos (10 pounds).

Sensitive to ⅕ gram (3 grains). **Price, without weights, $65.00**



2-070

2-070. BALANCE, TORSION, SMALL, in glass case. For quick and accurate weighings of 120 grams or less and for pharmaceutical work.

The entire mechanism is nickel plated and is enclosed in a plate glass case with nickel plated base and frame. A glass lid fits over the pans when the balance is not in use, thereby completely enclosing it.

The pans are made of nickel-silver, 3 inches diameter, have handles and are removable.

The beam has a rider-weight and two graduated scales. The upper one reads 0 to 8 grains in ⅛ grains and the lower one 0 to 500 milligrams in 5 milligram divisions. The rider-weight on the beam scale is operated from the right side of the case.

The beam-arrest is operated by a screw in the front of the base; this facilitates quick weighing and supports the beam when the balance is not in use.

Leveling screws are provided on each side of the base.

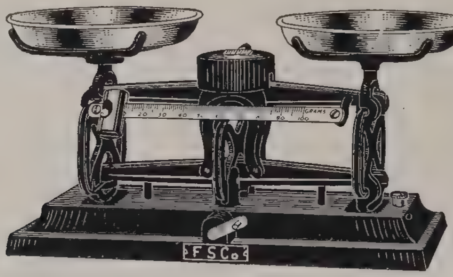
There are two horizontal indicators and a white index plate in the center.

Size of case, including the lid, 12 inches wide, 6½ inches high and 5 inches deep.

(See also, general description of Torsion Balances, preceding No. 2-065.)

Capacity, 120 grams (4 ounces).

Sensitive to 2 milligrams ($\frac{1}{32}$ grain). **Price, without weights, $60.00**



2-075

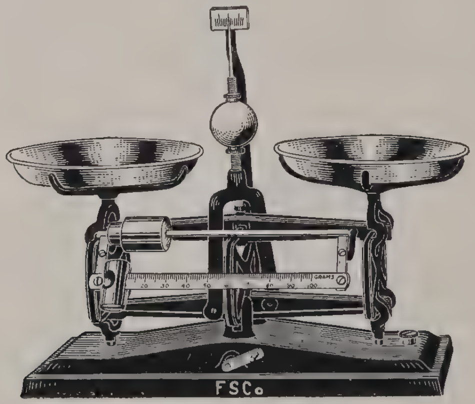
2-075. BALANCE, TORSION, DISPENSING. A quick-acting and sensitive laboratory balance for dispensing. Has a sliding weight and beam scale graduated to 100 grams in 1 gram divisions. There is an engraved index on the balance and the stationary indicator shows the swing of the balance on either side of zero.

Pan-arrest operated by crank in the front, facilitates quick weighing and supports the beam when not in use. Pans are nickel-plated brass, 6 inches diameter and are removable. Beam is 9 inches long and is nickel-plated; the sliding weight is also nickel-plated.

(See also general description of Torsion Balances, preceding No. 2-065.)

Capacity, 2 kilos (5 pounds).

Sensitive to ⅓ gram (5 grains). **Price, without weights, $31.00**



2-080 2-085

2-080. BALANCE, TORSION, CHEMICAL. This is a balance designed especially for chemical laboratory work. In addition to the features of the torsion balances, described just preceding No. 2-065, this balance has an extra beam and two sliding weights for counterbalancing containers, and also an upright indicator and an adjustable counterweight, which gives the balance greater sensitivity.

Reagents, composite solutions and chemical compounds can be made directly in the bottle, or other container. Sliding weight on the beam scale, graduated to 100 grams in 1 gram divisions, eliminates the necessity of the small weights.

To increase the sensitivity, the ball on the indicator is raised; to decrease the sensitivity the ball is lowered.

Pan-arrest operated by crank in the front, facilitates quick weighing and supports the beam when not in use.

Pans are nickel-plated brass, **6 inches diameter** and are removable.

Beam is nickel-plated, 9 inches long, graduated to 100 grams in 1 gram divisions.

Capacity, 2 kilos (5 pounds).

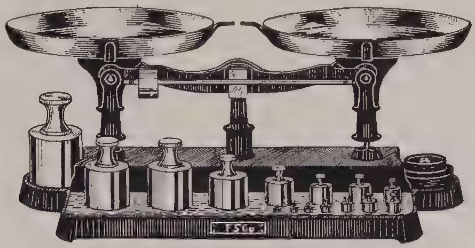
Sensitive to ⅛ gram (2 grains). **Price, without weights, $35.00**

2-085. BALANCE, TORSION, CHEMICAL. Like the No. 2-080 but a **larger size.** The **pans** on this balance are **9 inches diameter,** and the beam is 12 inches long.

The beam scale is graduated to 500 grams in 5 gram divisions.

Capacity, 4½ kilos (10 pounds).

Sensitive to ¼ gram (4 grains). **Price, without weights, $39.00**



2-090 2-095

2-090. BALANCE, METRIC, SOLUTION. Designed for the convenient and rapid making of reagents or composite solutions, or for weighing dry materials directly into the container. It can also be used for weighing in the pan.

The beam has a sliding weight which is moved to counterbalance the container so that it need not be compensated for in the weighings.

The balance has two removable brass **pans 5½ inches diameter.** The set of brass weights, 500 grams to 1 gram, is held in the shelf in the front of the base.

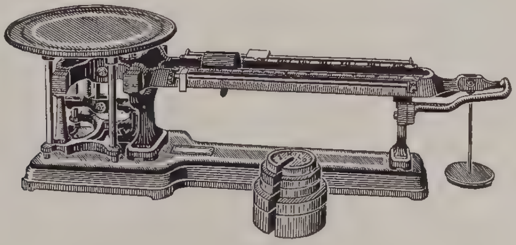
Capacity, 1 kilo.

Sensitive to ½ gram. **Price, with weights, $35.50**

2-095. BALANCE, METRIC, SOLUTION. This is a **larger size** of the No. 2-090 balance. The **pans** on this balance are **9 inches diameter;** the brass weights are from 2 kilos to 1 gram, and two extra iron weights are supplied which are used, in addition to the sliding weight, for counterbalancing heavier containers.

Capacity, 5 kilos.

Sensitive to ½ gram. **Price, with weights, $41.50**



2-100

2-100. BALANCE, SOLUTION, LARGE. This balance is designed for rapid and convenient making of large quantities of reagents, composite solutions or chemical compounds.

The container can be counterpoised by the sliding weight.

The plate which carries the container is made of iron and is 11 inches diameter.

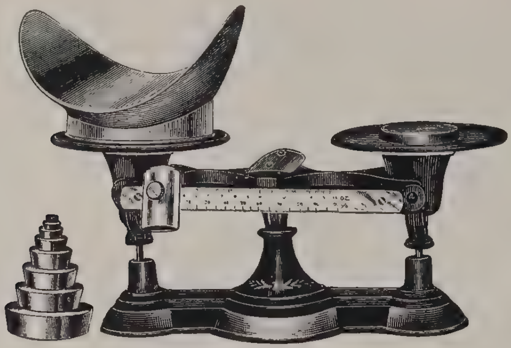
There are three beams in the same horizontal plane; the middle one carries the sliding weight for balancing containers up to 2¼ kilos; the rear beam has a sliding weight and scale of 1 kilo in 100 gram divisions; the front beam has a sliding weight and scale of 100 grams in 1 gram divisions. Separate weights smaller than 1 kilo need not be used.

There are iron weights from 10 kilos to 1 kilo.

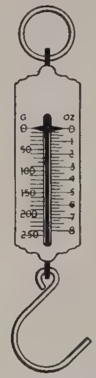
This balance is rugged; measures 32 inches over all and is quite sensitive for its capacity.

Capacity, 20 kilos.

Sensitive to 1 gram. **Price, with weights, $74.00**



2-105



2-110 2-115

2-105. BALANCE, AVOIRDUPOIS AND PER CENT. This is a very useful balance to have in the laboratory as it can be used in three different ways.

The balance has a detachable scoop 15 by 7½ inches, and a separate tared weight to be used with it. The beam is graduated 0 to 16 ounces in ¼ ounce divisions on the upper edge and 0 to 100% in 1% divisions on the lower edge.

1st. With the scoop on the left side, this balance can be used in the usual manner for weighing ¼ ounces up to 4 pounds, without the use of small weights.

2nd. Using a 1-pound sample, the material may be subjected to an operation and again weighed and the **per cent of gain** of the second weighing is read directly from the beam scale.

3rd. In moisture determinations, etc., where the sample weighs less after the operation, the loss in weight can be read directly from the beam, by putting the scoop with **1** pound of material on the right-hand pan and a 1-pound weight on the left pan. On the second weighing, the 1-pound weight remains on the left pan and the sliding weight is moved to the right to equalize the loss in weight and the **per cent of loss** is read directly from the lower scale on the beam.

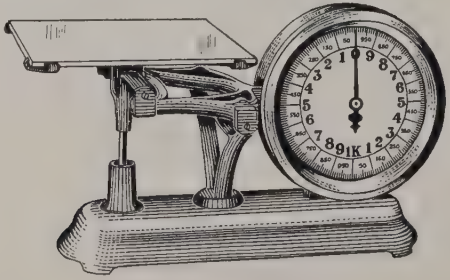
If a 2-pound sample is used, then the per cent of loss is just one-half of the reading on the per cent scale; if 3-pound, one-third, etc.

A set of iron weights from 2 pounds to ½ ounce, is supplied with this balance.

Capacity, 4 pounds. **Sensitive to** 1/16 ounce. **Price, with weights, $19.75**

2-110. BALANCE, SPRING, AVOIRDUPOIS and METRIC. An inexpensive spring balance graduated to **8 ounces** in **¼ ounce** divisions on one side of the indicator, and **250 grams** in **10 gram** divisions on the other side of the indicator. **Each, $1.75**

2-115. BALANCE, SPRING, AVOIRDUPOIS and METRIC. Similar to No. 2-110, but with larger capacity. Balance has a scale graduated to **64 ounces** in **1 ounce** divisions on one side of the indicator, and **2000 grams** in **25 gram** divisions on the other side. **Each, $1.25**



2-120 2-125

2-120. BALANCE, CIRCULAR DIAL, GLASS PLATFORM, 2 KILOS. This is a center-pivot type balance with steel knives and **agate bearings** and does not require the use of weights.

It is adapted for quick weighing; the weight of the container is shown directly on the dial, and the weight of the liquid or solid is continuously observed as it is added. A zero adjustment underneath the balance is provided.

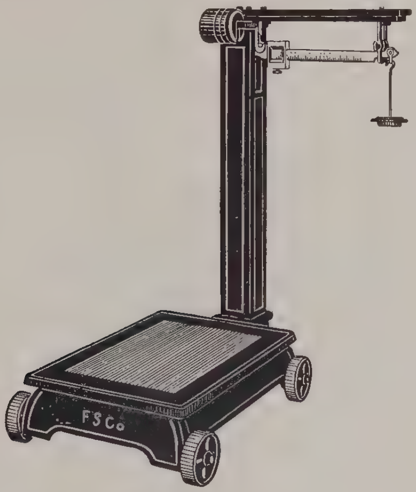
The platform is a white glass plate 11 inches square.

The balance has front and rear dials, 8 inches diameter, enclosed in glass with **nickel-plated** metal frame. This permits the balance to be used from either side of a chemical table.

Dials are graduated to **2 kilos** in **10 gram** divisions. Metal parts are finished in gold bronze. **Each, $33.00**

2-125. BALANCE, CIRCULAR DIAL, GLASS PLATFORM, 5 Pounds. This balance is similar to No. 2-120, but is made for reading the weight directly in pounds avoirdupois.

Dials are graduated to **5 pounds** in **½ ounce** divisions. **Each, $33.00**



2-130 **2-135**

2-130. BALANCE, PLATFORM, Avoirdupois. For heavy weighing in the laboratory, storeroom or factory. The balance is mounted on four wheels so that it is easily moved from place to place. The beam is of polished brass with clear-cut graduations and large legible figures. The necessary weights are supplied with the balance.

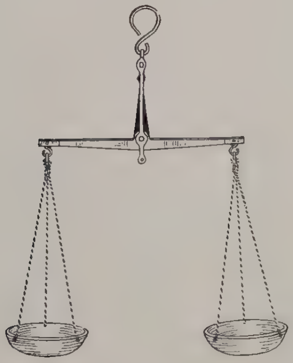
Size A. Capacity, 500 pounds, with beam graduated to 50 pounds in ¼ pound divisions. Platform measures 16 inches by 25 inches. **Each, $33.00**

Size B. Capacity, 1000 pounds, with beam graduated to 100 pounds in ½ pound divisions. Platform measures 18 inches by 27 inches. **Each, $43.00**

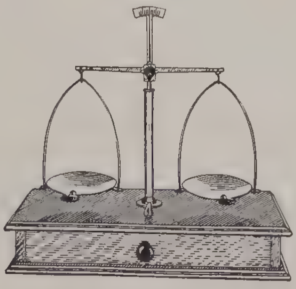
2-135. BALANCE, PLATFORM, Metric. This balance is like No. 2-130 but with beam graduated in the metric system and supplied with metric weights.

Size A. Capacity, 300 kilos, with beam graduated to 25 kilos in 100 gram divisions. Platform, 16 by 25 inches. **Each, $33.00**

Size B. Capacity, 500 kilos, with beam graduated to 50 kilos in 200 gram divisions. Platform, 18 by 27 inches. **Each, $43.00**



2-140



2-145

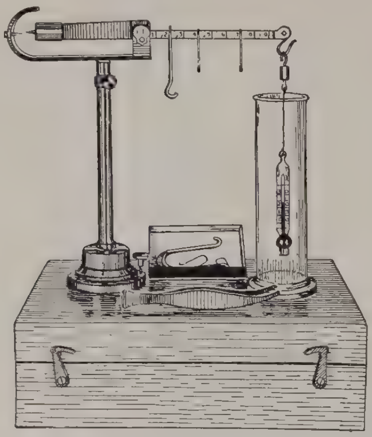
2-140. BALANCES, HAND. The beam, the indicator and the support are made of brass, polished and lacquered; the pans are made of horn and each pan is hung by three silk cords. Made in two sizes.

Length of beam, millimeters	150	170
Diameter of pans, millimeters	60	70
Each, without weights	**$2.75**	**3.00**

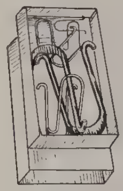
2-145. BALANCE, PRESCRIPTION, PORTABLE. An inexpensive balance for light weighing, mounted on wooden base with drawer. The pans are nickel-plated, have handles, and are removable. The beam is raised and lowered by means of a lever. The pillar, beam, hangers and pans can be packed in the drawer. The beam is 6 inches long and the pans 2½ inches diameter. **Without weights, $7.00**

(*Prescription Weights are listed under No. 2-335.*)

2-155



2-150



2-160

2-150. BALANCE, SPECIFIC GRAVITY, WESTPHAL. A very popular and ingenious balance with which the specific gravity of a liquid can be determined to the third decimal place without any calculations.

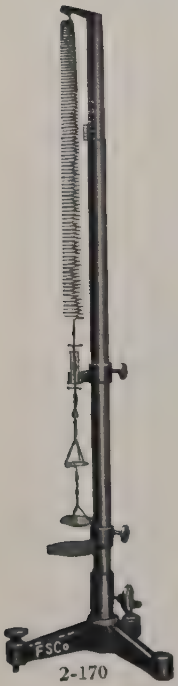
The glass plummet displaces 5 grams of water at 15° C., and the largest rider weighs 5 grams and equals 1 when placed on the same hook with the plummet. The other riders weigh 0.5, 0.05 and 0.005 respectively, and correspond to their respective decimal places.

If the liquid is heavier than water, the largest rider is placed on the plummet hook and the beam balanced with the other weights and the specific gravity read.

If the liquid is lighter than water, the heaviest rider is placed on the beam, then the next size rider is placed, and so on until the beam balances, and the sum total of the riders represents the specific gravity.

Example: If the largest rider rests on the notch marked 7, and the next largest on notch 6, and the next largest on notch 4, the specific gravity of the liquid in which the plummet is immersed is 0.764.

The balance is made of brass, the pillar is adjustable for height, the knife is steel, and the bearings are agate. The hardwood case is equipped so the balance and its parts can be packed in it and held in place. The price includes the balance, Reimann thermometer-plummet, set of rider-weights, brass forcep, glass jar, hardwood case, and directions for using. **Each, $23.50**



2-170

2-155. REIMANN THERMOMETER-PLUMMET for Westphal balance No. 2-150. The plummet is made of glass and contains a thermometer reading 10 to 30° C.; it displaces 5 grams of water at 15° C. The total weight of the plummet, wire and metal hook is 15 grams. **Each, $3.75**

2-160. RIDER-WEIGHTS for Westphal balance No. 2-150. Set of 8 weights, two each of four different sizes. **Per set, $2.50**

2-165. GLASS JAR for use with Westphal balance No. 2-150; height, 5 inches. **Each, $ .35**

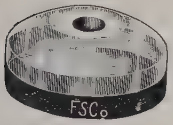
2-170. BALANCE, SPECIFIC GRAVITY, JOLLY SPIRAL SPRING, precision type, with vernier reading attachment. This balance is constructed with telescoping tubes, the inner one of which is caused to move upward or downward by means of an internal rack-and-pinion operated by a knurled thumb-screw located at the side near the bottom.

The inner tube is graduated for a length of 50 centimeters in tenths, while the outer tube is provided at the top with a vernier, past which the scale on the inner tube slides, enabling the instrument to be read to $^1/_{10}$ of a millimeter. The inner tube has a range of motion of 50 centimeters, which, by the proper choice of a spring, permits the use of this balance for a wide variety of purposes. It is substantially made and has nickel-plated tubes mounted on a tripod base of japanned iron, provided with leveling screws.

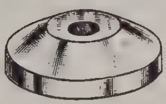
Many uses may be found for this balance in any laboratory, where quick and accurate determinations of specific gravity of solids are made. It has become the standard means for determining the specific gravity of rubber and rubber products.

Complete with light and heavy spring, special indicator and stops, adjustable platform and aluminum and glass pans. **Each, $50.00**

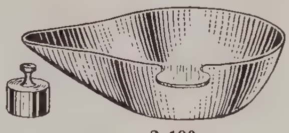
BALANCE, Specific Gravity. See also No. 2-025.



2-175



2-180



2-190
See also No. 2-185

2-175. BALANCE RESTS, of glass, with **rubber cushions,** to be placed under the leveling feet of analytical balances. **Each, $ .85**

2-180. BALANCE RESTS, of glass, to be placed under the leveling feet of analytical balances. **Each, $ .25**

2-185. BALANCE DISH of **Nickel Silver;** "Sugar Capsule." Each dish is supplied with a counterpoised brass weight. Capacity of dish, about 30 cubic centimeters. **Without handle.** **Each, $4.25**

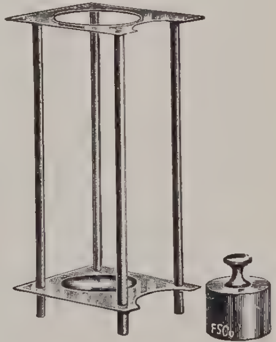
2-190. BALANCE DISHES of **Aluminum,** with spout and handle. Each dish is supplied with a counterpoised brass weight. Made in two sizes.

Capacity, cubic centimeters	15	30
Each	**$2.00**	**2.40**

2-195

2-200

2-205



2-210

2-195. BALANCE PANS of glass. Supplied in pairs of exactly the same weight.

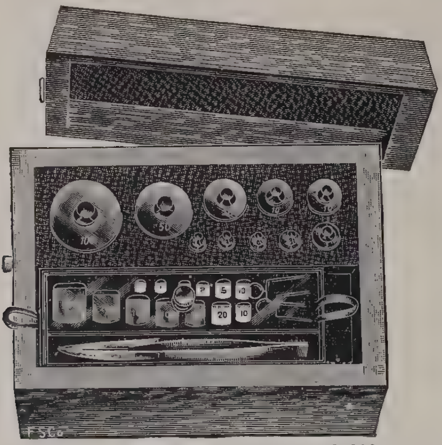
Diameter, inches	2½	3
Per pair	**$1.00**	**1.00**

2-200. BALANCE PANS of glass **with handles.** Supplied in pairs of exactly the same weight.

Diameter, inches	2½	3
Per pair	**$1.50**	**1.50**

2-205. BALANCE SCOOP of glass, deep form with flat bottom, width 2¾ inches, length 4⅛ inches. **Each, $1.25**

2-210. BALANCE WEIGHING TUBE SUPPORT. Made of metal, nickel-plated; supplied with a counterpoised brass weight. To be used on the balance pan for holding the tall weighing bottles in either a vertical or horizontal position. **Each, $4.00**



2-215 2-220 2-225 2-230

BALANCE WEIGHTS, ANALYTICAL

Weights No. 2-215, No. 2-220, No. 2-225 and No. 2-230 are double checked, analytical weights having the accuracy required for precise weighing in scientific and technical laboratories. Each weight has been carefully adjusted so that it is within the tolerance given for that particular weight in the following table.

Weight	Tolerance	Weight	Tolerance	Weight	Tolerance
200 grams	1.0 mg.	5 grams	0.15 mg.	20 mg.	0.03 mg.
100 grams	0.5 mg.	2 grams	0.15 mg.	10 mg.	0.03 mg.
50 grams	0.3 mg.	1 gram	0.10 mg.	5 mg.	0.02 mg.
20 grams	0.2 mg.	500 mg.	0.10 mg.	2 mg.	0.02 mg.
10 grams	0.2 mg.	200 mg.	0.05 mg.	1 mg.	0.02 mg.
		100 mg.	0.05 mg.		
		50 mg.	0.04 mg.		

2-215. BALANCE WEIGHTS, High Grade Analytical. Gram weights are **lacquered brass**; fractions 50 milligrams to 500 milligrams are **22 carat gold** and fractions 1 milligram to 20 milligrams are aluminum and are large enough to be easily handled.

For the last eight years we have supplied weights using this same hard gold for the fractions, and they have been used with satisfaction and at a saving in price.

All the fractional weights have one side turned up at a right-angle, which makes them very easy to handle with a forcep. The set contains the duplicate weights necessary to make any total within its range.

Each set is in a velvet-lined, polished mahogany case, provided with a lid which may be removed and set aside so that it will not interfere with the transferring of the weights to the balance.

Each set contains an ivory-tipped forcep and two 5 milligram riders.

Brass grams—gold fractions.

Sets from 1 milligram to grams	20	50	100	200
Per set	**$15.50**	**17.50**	**19.50**	**25.50**

2-220. BALANCE WEIGHTS, High Grade Analytical. The gram weights in these sets are **gold plated** instead of lacquered brass, otherwise the weights are the same as those described under No. 2-215.

Gold-plated grams—gold fractions.

Sets from 1 milligram to grams	50	100	200
Per set	**$20.50**	**23.00**	**30.00**

2-225. BALANCE WEIGHTS, High Grade Analytical.

These sets have the **fractional weights** 50 milligrams to 500 milligrams made of **platinum,** otherwise they are the same as those described under No. 2-215.

Brass grams—platinum fractions.

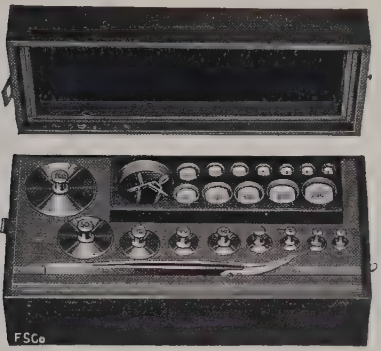
Sets from 1 milligram to grams	20	50	100	200
Per set	**$22.00**	**24.00**	**26.00**	**33.00**

2-230. BALANCE WEIGHTS, High Grade Analytical.

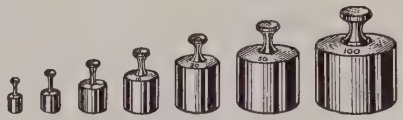
These sets have **gold-plated gram weights,** and the **fractional weights** 50 milligrams to 500 milligrams are **platinum,** otherwise they are the same as those described under No. 2-215.

Gold-plated grams—platinum fractions.

Sets from 1 milligram to grams	50	100	200
Per set	**$26.50**	**29.50**	**38.00**

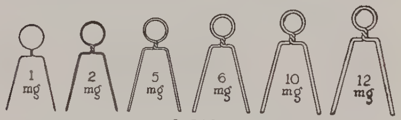


2-235



2-240 2-245

2-255 2-250



2-260

2-235 BALANCE WEIGHTS, U. S. Bureau of Standards Certified. These weights are intended for analytical and research work requiring the highest degree of precision, and for obtaining results to be used in litigation. They are also used as a standard for checking the weights in regular use.

The United States Bureau of Standards has checked each set, and we furnish their certificate giving the correction, if any, for each weight in the set.

Before such a certificate is issued, each weight must meet their specifications and the correction must not be greater than the following tolerances established for Class S weights.

Weight	Tolerance	Weight	Tolerance	Weight	Tolerance
100 gram	0.5 mg.	2 gram	0.10 mg.	20 mg.	.03 mg.
50 gram	0.3 mg.	1 gram	0.10 mg.	10 mg.	.02 mg.
20 gram	0.2 mg.	500 mg.	.05 mg.	5 mg.	.02 mg.
10 gram	0.15 mg.	200 mg.	.05 mg.	2 mg.	.01 mg.
5 gram	0.15 mg.	100 mg.	.05 mg.	1 mg.	.01 mg.
		50 mg.	.03 mg.		

The gram weights are lacquered brass; the fractions 1 milligram to 20 milligrams are aluminum and those 50 milligrams to 500 milligrams are **platinum.** The set is contained in a polished mahogany case with a loose cover and includes ivory tipped forceps.

No. 2-235 Weights with U. S. Bureau of Standards Certificate.

Sets from 1 milligram to grams	50	100
Per set	**$60.00**	**64.00**

2-240. BALANCE WEIGHTS, Single Grams of Brass. These are **high-grade analytical** weights, the same as used in sets No. 2-215 and No. 2-225 and have been adjusted to the tolerances given for No. 2-215 weights.

Grams	1	2	5	10	20	50	100
Each	**$ .70**	**.80**	**.95**	**1.20**	**1.50**	**1.90**	**2.30**

2-245. BALANCE WEIGHTS, Single Grams, Gold-plated. These are **high-grade analytical** weights, the same as used in sets No. 2-220 and No. 2-230 and have been adjusted to the tolerances given for those weights.

Grams	1	2	5	10	20	50	100
Each	**$1.00**	**1.10**	**1.25**	**1.60**	**2.00**	**2.40**	**3.00**

2-250. BALANCE WEIGHTS, Single Fractions, Gold. These weights are the same as those used in sets No. 2-215 and No. 2-220, are **high-grade analytical** quality and are adjusted to the tolerances given for those weights.

Weights 1 milligram to 20 milligrams are aluminum, and weights **50 milligrams** to **500 milligrams** are **22 carat gold.**

Milligrams	1	2	5	10	20	50	100	200	500
Each	**$ .50**	**.50**	**.50**	**.50**	**.60**	**.75**	**1.00**	**1.50**	**2.25**

2-255. BALANCE WEIGHTS, Single Fractions, Platinum. The weights are the same as those used in sets No. 2-225 and No. 2-230, and are **high-grade analytical** quality adjusted to the tolerances given for those weights.

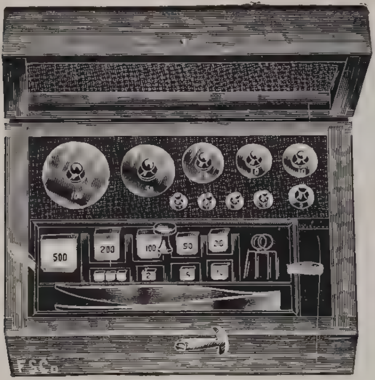
Milligrams	50	100	200	500
Each	**$1.35**	**1.75**	**2.75**	**5.00**

(*Aluminum fractions 1 milligram to 20 milligrams, see No. 2-250.*)

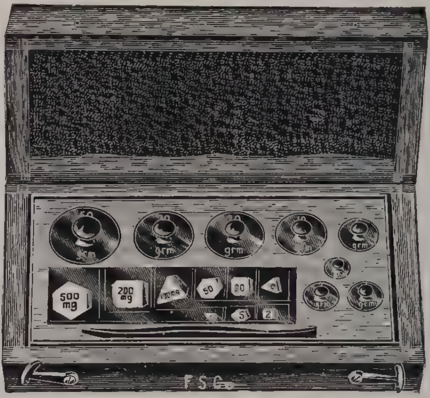
2-260. BALANCE RIDERS, of aluminum. Accurately adjusted.

Milligrams	1	2	5	6	10	12
Each	**$ .45**	**.40**	**.40**	**.40**	**.40**	**.40**

Balance Weights



2-265



2-270

2-265. BALANCE WEIGHTS. Students' Analytical. These weights are adjusted for Students' analytical work, and are intended for use with balance No. 1-915, and similar ones; they are not as precise as the No. 2-215 weights, but they are a students' analytical grade and are more accurate than the No. 2-270 medium grade weights.

The gram weights are lacquered brass; the fractions are nickel-silver and aluminum. The set contains the duplicate weights necessary to make any total within its range. All the fractional weights have one side turned up at a right-angle, which makes them very easy to handle with a forcep. Each set is contained in a polished mahogany case, with hinged cover and contains two 10 milligram riders and a brass forcep; the fractional weights are covered with a glass plate.

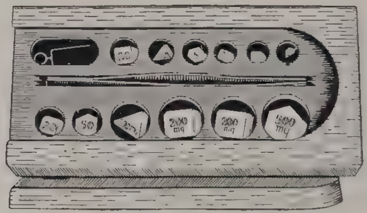
Set from 1 milligram to grams	50	100
Per set	**$9.00**	**10.00**

2-270. BALANCE WEIGHTS, Nickel-plated, for **General Laboratory** and **Students' use.** These weights are not intended for precise analytical work, but are more accurate than the ordinary weights. They are first laboratory grade for use with general laboratory balances No. 1-955 No. 1-970 and No. 2-000 for students' use, and for the Torsion and other scales where accurate weighings are desired.

The gram weights are **nickel-plated brass;** the fractions are nickel-silver and aluminum and each weight is a different shape so that they are not easily confused. Each set contains the duplicate weights necessary to make any total within its range. The set is contained in a polished hardwood case with hinged cover; the fractions are protected by a glass plate, and a nickel-plated forcep is supplied.

Sets from 1 milligram to grams	50	100	200	500	1000
Per set	**$5.50**	**6.50**	**8.50**	**12.00**	**15.00**

2-275



2-280

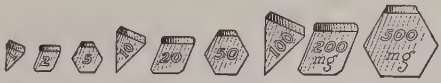
2-275. BALANCE WEIGHTS, Students'. These are inexpensive weights of a quality for students' use and for ordinary laboratory work.

The gram-weights are lacquered brass and the fractions are nickel-silver and aluminum. Each set contains the duplicate weights necessary to make any total within its range. The set is contained in a polished hardwood case with hinged cover.

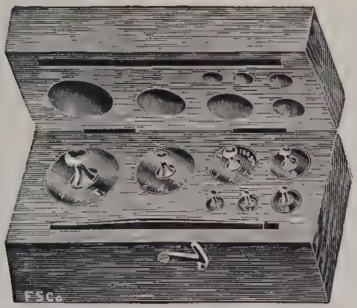
Sets from 10 milligrams to grams	50	100	200	500	1000
Per Set	**$2.75**	**3.25**	**4.50**	**6.50**	**9.00**

2-280. BALANCE WEIGHTS. A Set of fractions in box with sliding cover, a brass forcep and a 5 milligram rider.

These weights are of medium quality and are intended primarily for students' use; the set contains weights from 1 milligram to 500 milligrams with two each of 2, 20, and 200 milligram weights; made of nickel-silver and aluminum. Each weight is contained in a separate compartment. **Per set, $2.00**



2-285



2-290

2-295

2-285. BALANCE WEIGHTS, Single Fractions, Student Quality. These weights are made of nickel-silver and aluminum and are of a quality for students' use.

Each weight is a different shape so that they are not easily confused.

Milligrams	1	2	5	10	20	50	100	200	500
Each	**$ .18**	**.18**	**.18**	**.18**	**.18**	**.18**	**.18**	**.18**	**.18**

Per dozen, $1.50

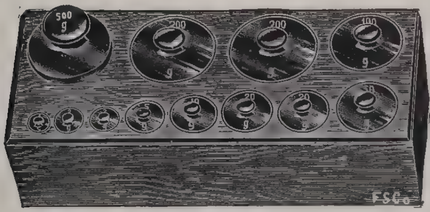
2-290. BALANCE WEIGHTS. Assay-Ton. These weights are intended to simplify calculations in making assays and are used for weighing the sample. One assay-ton is 29.166 grams, and contains as many milligrams as there are troy ounces in a 2000-pound avoirdupois ton. Using 1 assay-ton, each milligram weight of the button produced will represent 1 troy ounce to the avoirdupois ton.

Set from **$^1/_{20}$ AT** to **4 AT** in polished hardwood case. **Per set, $10.00**

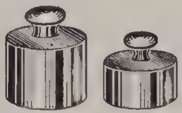
2-295. BALANCE WEIGHTS. Assay Button. These are high-grade precision weights, adjusted to the tolerances for Class S weights noted under No. 2-235.

The set includes weights from **1 gram** to **$^1/_{10}$ milligram**; weights from 1 gram to 50 milligrams are **platinum,** and those from 20 milligrams to 1 milligram are aluminum.

The set is contained in a velvet lined ebony box with hinged cover. **Per set, $50.00**



2-300



2-305

2-300. BALANCE WEIGHTS. Brass Grams. These weights are the ordinary grade of brass metric weights for laboratory work. Each set is in a polished wood block (without fractions). Weights 2 gram, 20 gram, 200 gram and 2000 gram are duplicated.

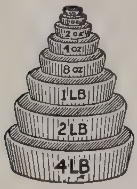
Sets from 1 gram to grams	100	200	500	1000	2000	5000
Per set	**$2.50**	**3.25**	**5.50**	**8.00**	**15.00**	**30.00**

2-305. BALANCE WEIGHTS. Single Brass Grams. The ordinary grade of brass metric weights for laboratory work, the same as those used in sets No. 2-300.

Grams	1	2	5	10	20	50	100	200	500
Each	**$ .15**	**.20**	**.20**	**.20**	**.25**	**.45**	**.65**	**.85**	**1.60**

Balance Weights

2-310



2-315

2-320

2-325

2-310. BALANCE WEIGHTS, Avoirdupois Fractions, made of nickel-silver with one side turned up so they can be readily handled with a forcep.

Set from $^1/_{128}$ **ounce to ¼ ounce**...**Per set $3.85**

2-315. BALANCE WEIGHTS, Avoirdupois. For coarse weighing. These weights are **nickel-plated** iron and are non-rusting.

Sets from ¼ ounce to pounds	1	2	4	8
Per set	**$2.25**	**2.90**	**4.00**	**6.00**

2-320. BALANCE WEIGHTS, Factor. Complicated calculations may often be avoided by using a sample of an odd weight. The operation of weighing the sample is then simplified and quickened by using a factor weight which has been adjusted to the particular weight desired.

We will supply to order, factor weights of any particular weight desired.

The following factor weights for iron and steel analysis, are carried in stock. They are made of lacquered brass.

Carbon Factor	2.7273 grams	**Each, $2.00**
½ Carbon Factor	1.3636 grams	**Each, $2.00**
¼ Silicon Factor	1.1755 grams	**Each, $2.00**
Phosphorus Factor	1.63 grams	**Each, $2.00**

2-325. BALANCE WEIGHTS, Metric Iron, for coarse weighing. The 20 gram and 200 gram pieces are duplicated.

Sets, 5 gram to kilos	1	2	4
Total capacity, kilos	2	4	8
Per set	**$3.25**	**4.50**	**6.50**

2-330

2-340

2-345 2-350

2-335

2-355

2-330. BALANCE WEIGHTS, Metric. Small inexpensive sets; gram pieces are brass; fractions are aluminum. The 2 gram, 200 milligram and 20 milligram weights are duplicated. Set is supplied in a small metal box.

Sets from 10 milligrams to grams	1	10
Per set	**$ .75**	**1.50**

2-335. BALANCE WEIGHTS, Prescription; set from **2 drachms to ½ grain.** Weights 2 drachm to ½ scruple are circular and are brass; the smaller weights are rectangular and are made of nickel-silver. Set is supplied in a small metal box. **Per set, $1.50**

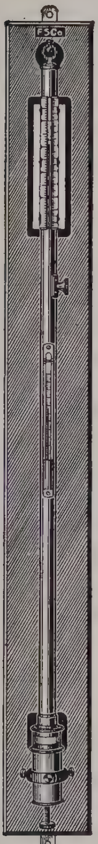
2-340. BALANCE WEIGHTS, Grain, of aluminum. Made concave so that they can be easily handled with forceps. Set **½ grain to 10 grains** in small box. **Per set $1.25**

2-345. BALANCE WEIGHT FORCEPS, BRASS, curved shape, with rounded ends. For handling small weights. **Each, $ .20**

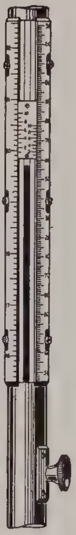
2-350. BALANCE WEIGHT FORCEPS, NICKEL-PLATED. The same forcep as No. 2-345, but nickel-plated and polished. **Each, $ .30**

2-355. BALANCE WEIGHT FORCEPS, with **IVORY TIPS.** This forcep is curved shape and the tips have rounded ends; it is the forcep which should be used for handling high grade analytical weights as the ivory tips will not scratch the weights. **Each, $ .90**

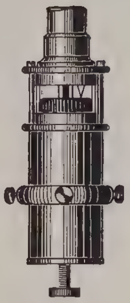
BAROMETERS



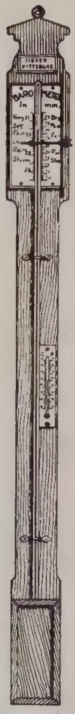
2-380



Enlarged view of scale of No. 2-380



Enlarged view of cistern of No. 2-380



2-385

2-380. BAROMETER, Precision Mercurial, Fortin Principle, U. S. Army Signal Corps Type. This is the instrument for making precise Barometric Pressure Corrections in laboratory operations. It is also used in Weather Observatories, Factories, Mines and Power Plants.

The Mercury Cistern is constructed on the Fortin Principle adjustable to zero; with zero indicated by an ivory point in the cistern. The glass Barometer Tube is carefully made and annealed, and mounted in a bronzed metal casing. The Scale is calibrated from 25.5 to 31 inches, and from 650 to 790 millimeters, with Vernier reading to 1/100 inch and to 1/10 millimeter. The Thermometer is calibrated in both the Fahrenheit and Centigrade Scales, and is easily detached for checking with other thermometers. The Barometer is mounted on a polished mahogany board, 4½ inches wide and 43 inches long, and is equipped with Opal Glass Reflectors to facilitate observation of the Cistern and Meniscus.

The illustration shows an enlarged view of the Cistern, also an enlarged view of the Scale and Vernier.

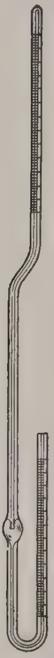
This Barometer is calibrated for use at altitudes up to 3000 feet above sea level, and will be supplied on all orders, unless otherwise specified. Prices of Barometers for altitudes higher than 3000 feet are quoted upon request. **Each, $80.00**

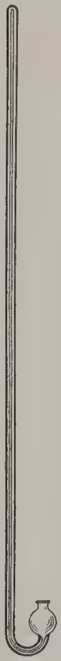
2-385. BAROMETER, Mercurial, Educational Model, with Bent-End Barometer Tube, (like No. 2-395) having a bulb for reservoir for the mercury. The general construction and accuracy is that of a medium-grade instrument, suitable for school laboratories and educational purposes.

The Barometer is mounted on a polished, hard-wood board, 38 inches long; with Milk Glass Scale calibrated from 27½ to 31 inches, and from 700 to 800 millimeters. A Thermometer, graduated in both Fahrenheit and Centigrade, is attached to the board.

This Barometer is suitable only for altitudes up to 2500 feet above sea level. **Each, $15.00**

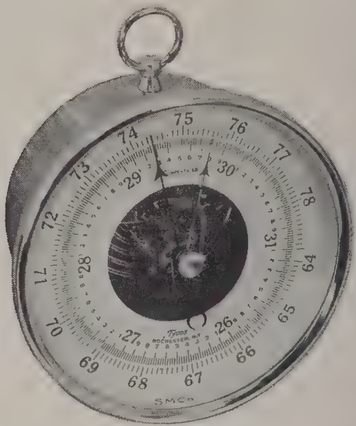
Barometers


2-390


2-395

2-400

2-410



2-405

2-390. BAROMETER, Bunsen Syphon Type, made entirely of glass, about 34 inches over all, calibrated from 600 to 800 mm.; used for educational purposes, and suitable for altitudes up to 6000 feet above sea level. This tube is to be filled and mounted in the laboratory, and is supplied without mercury, and without barometer board. **Each, $5.00**

2-395. BAROMETER TUBE, Bent End, with bulb as Mercury Well; made of heavy wall, glass barometer tubing, length over all, 33½ inches; same as used on No. 2-385 Barometer. Furnished without mercury. **Each, $3.00**

2-400. BAROMETER TUBE, Straight, made of heavy wall, glass barometer tubing, closed at one end, 36 inches long. Same style as used on No. 2-380 Barometer, to be filled with mercury and used with an independent mercury well. **Each, $1.50**

2-405. BAROMETER, Aneroid, Compensated for Temperature; as supplied to the U. S. Navy, U. S. Weather Bureau, U. S. Bureau of Plant Industry, etc. The Barometer is 5 inches diameter, with open-centered, silvered, metal dial, graduated in millimeters and inches with great accuracy. A screw in the rear permits adjustment of the zero setting. The movement is high grade and compensated for temperature, thus insuring accurate readings of Barometric Pressure, for altitudes up to 8000 feet. **Each, $20.00**

2-410. BAROMETER, Aneroid, Pocket Size. Compensated for temperature; watch style; gold-plated case, 1¾ inches diameter; silvered-metal dial; altitude scale up to 8000 feet in 50-foot divisions; supplied in soft leather case. A screw in the rear permits adjustment of the zero setting. The quality is good and can be recommended for educational purposes to measure altitudes and, also, for use with Flash Point Testers in oil chemistry. **Each, $35.00**

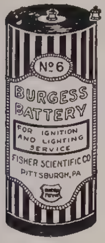
BASKETS, for Centrifuges, see Centrifuge Baskets.

BASKETS, for Test Tubes, see Test Tube Baskets.

BATHS, Air, see Ovens and Sterilizers.

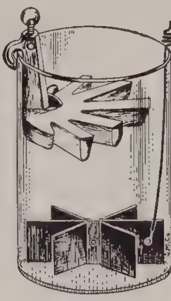
BATHS, Sand, see Sand Baths.

BATHS, Water, see Water Baths.



2-425

2-430



2-450

2-425. BATTERY, Dry Cell, Burgess No. 6. A high-grade cell made especially for open-circuit work. Used **for Ignition** and **General Lighting Service**; E.M.F. 1½ volts; diameter, 2½ inches; height, 6 inches. These batteries are more uniform, and give longer service than the ordinary "dry cells"; they have a remarkable ability to recuperate when not in use. **Each, $ .50**

2-430. BATTERY, Carbon Cylinder, Sampson No. 2.; suitable for **open circuit** work; E.M.F. 1.5 volts, internal resistance about 0.07 ohms. The "Sampson" is recommended for a battery of this type, because of its long service and ability to recuperate quickly. Dimensions over all, 4½x4½x8 inches. **Each, $3.25**

2-435. GLASS JAR, for No. 2-430 Battery. Each, $1.00

2-440. CARBON ELEMENT, for No. 2-430 Battery. Each, $1.50

2-445. ZINC ELEMENT, for No. 2-430 Battery. Each, $ .70

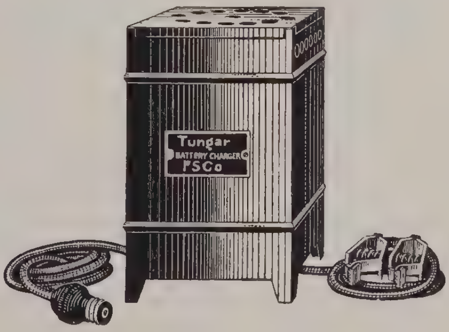
2-450. BATTERY, Gravity, Crowfoot Type. Especially adapted for **closed circuit** work, as used by telegraph and signal companies; E.M.F. about 1.1 volts, internal resistance about 1 to 5 ohms. Consists of Glass Battery Jar, Zinc Crowfoot and Copper Star; Jar is 6 inches in diameter and 8 inches high, capacity one gallon; furnished without chemicals. **Each, $2.75**

2-455. GLASS JAR, for No. 2-450 Battery. Each, $ .90

2-460. ZINC CROWFOOT, for No. 2-450 Battery. Each, $1.00

2-465. COPPER STAR, for No. 2-450 Battery. Each, $ .35

2-470



2-480 2-490

2-470. BATTERY, Storage, Westinghouse, 3 cells. Initial E.M.F. 6 volts; rated at 90 ampere hours, at the 3-ampere intermittent rate; provided with Westinghouse patented Post Seal which prevents acid creepage. Supplied with a hard-rubber case measuring 8½x6¾x8¾ inches, provided with a detachable metal handle. This Battery is recommended for its long life and adaptability for use in laboratory experiments, also as an "A" Battery in Radio work. **Each, $19.00**

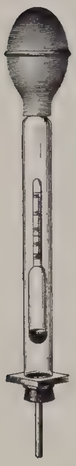
2-480. BATTERY CHARGER, Tungar Rectifier, 2-ampere size. Consists of a current rectifying bulb, similar to an incandescent lamp, and a compensator, mounted in a metal case. Supplied with cord and plug for lamp socket connection; leads for battery connection, and equipped with battery clips. With this charger, the direct current necessary for recharging storage batteries is readily obtained by attaching the charger to a 110-volt A.C. line. This charger will deliver a current of 2 amperes at from 7.5 to 15 volts, and may be used on A.C. lines, with a voltage of 105 to 125. This will charge one 3-cell storage battery at the rate of 2 amperes, or one 6-cell battery at the rate of 1 ampere. **Each, $20.00**

2-485. RENEWAL BULB, for No. 2-480 Rectifier. Each, $ 5.75

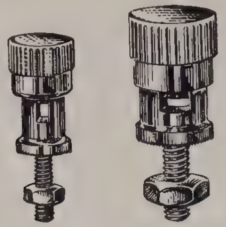
2-490. BATTERY CHARGER, Tungar Rectifier, 5-ampere size. Similar to No. 2-480, but will deliver 5 amperes at 7.5 to 15 volts D. C. For use on 105 to 125-volt, 60-cycle A.C. lines, and capable of charging one 3-cell battery at 5 amperes, or two 3-cell batteries at 2½ amperes, or one 6-cell battery at 2½ amperes. Weight 15 pounds. **Each, $30.00**

2-495. RENEWAL BULB, for No. 2-490 Rectifier. Each, $10.75

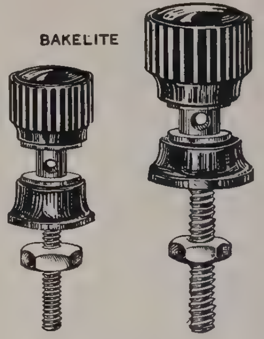
Battery Accessories



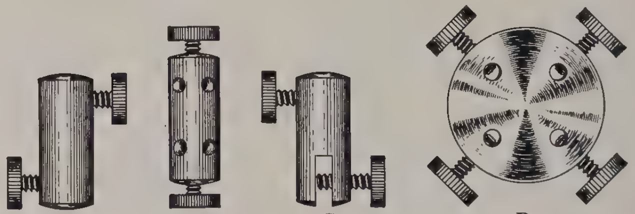
2-500



Actual Size
2-505



Actual Size
2-510



2-515

2-500. BATTERY TESTER (Hydrometer), for determining the strength of battery fluids in storage and other cells. This tester does away with the splashing of acid in transferring the liquid to a hydrometer jar. Sufficient battery liquid to float the hydrometer is drawn into the glass tube and the reading made directly. The scale of the hydrometer is marked in specific gravity, and also with words indicating the strength of the fluid. The battery is fully charged at 1.280, and is empty or "dead" at 1.150. The tester is prevented from rolling, by a square rubber piece placed over the end of the glass tube. **Each, complete, $1.00**

2-505. BATTERY BINDING POSTS, Square Slot, all metal; made of brass, nickel-plated, making a neat appearance on laboratory apparatus. The method of making the contact is different from that of the common screw-type posts. The square slot is milled the entire width of the body, and forms the lower contact surface. The sliding shoe, operating in the slot, forms the other contact surface and is raised or lowered by the screw cap. This knurled cap is spun on, preventing loss, and positive contact can be made on a fine wire or terminal, by tightening the cap with the fingers. The base is heavily knurled to prevent the post turning when mounted. The posts are attached to any support by the machine screw and nut. Made in two sizes, as shown in the full sized illustration.

Diameter of cap, inch	⅜	½
Width of slot, inch	3/32	⅛
Height of slot, inch	⅛	5/32
Each	$ .20	.30

Per dozen, 15% discount.

2-510. BATTERY BINDING POSTS, Bakelite, Insulated, metal parts of brass, made so that the tops do not come off. Both contact surfaces are unusually large, assuring a positive contact on a spade clip, a looped wire or a telephone terminal. Each post is provided with a machine screw and nut for attaching to supports. The lower Bakelite base has a knurled piece inserted on the bottom; this prevents the post from turning when nut is tightened.

These posts are substantially built, look well on laboratory apparatus and can be easily operated with the fingers on account of the deeply knurled Bakelite top. Made in two sizes, as shown in the full sized illustration.

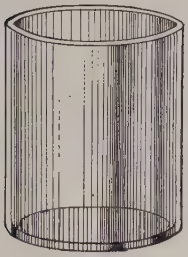
Diameter of top, inch	½	⅝
Length over all, inches	1½	1¾
Each	$ .35	.40

Per dozen, 15% discount.

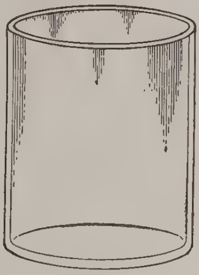
2-515. BATTERY CONNECTORS, of brass, with knurled screw heads. For making electrical connections, with wires in groups of two and four; made in the styles as shown in the illustration.

Style	A	B	C	D
Number of connections	2	4	2	4
Each	$ .15	.35	.20	.45

Per dozen, 15% discount.



2-520



2-525

2-530

2-520. BATTERY JARS, Round, Green Glass, with ground rims. These jars are less expensive than the white glass jars, and serve the purpose of battery jars equally as well. They are also used for large containers. If a jar of this style is to be used for observation purposes, then the white glass jar No. 2-525, is more desirable.

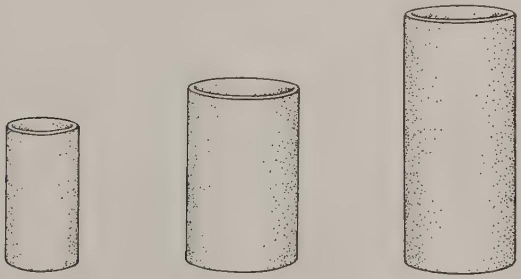
Diameter, inches	4	5	6	7	9
Height, inches	5	7	8	9	12
Approx. capacity, quarts	1	2	4	7	14
Each	**$ .45**	**.70**	**.90**	**1.35**	**2.75**

2-525. BATTERY JARS, Round, White Glass, with ground rims. Used for Batteries, for Aquaria, and also as containers, for laboratory work, where the contents are to be observed.

Diameter, inches	4	5	6	7	9
Height, inches	5	7	8	9	12
Approx. capacity, quarts	1	2	4	7	14
Each	**$ .95**	**1.45**	**1.70**	**2.25**	**4.00**

2-530. BATTERY JARS, Rectangular, of White Glass, with ground rims.

Width, inches	2½	4
Length, inches	4¼	4
Height, inches	7	8
Approx. capacity, quarts	1	1¾
Each	**$ .90**	**1.00**



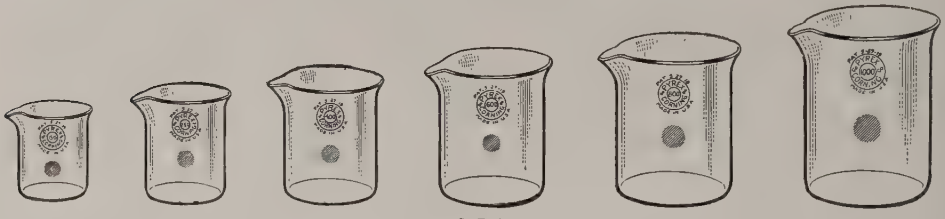
2-535

2-535. BATTERY POROUS CUPS, made of porous, white clay. Used for making galvanic batteries, dializing cells, and in electrolysis experiments.

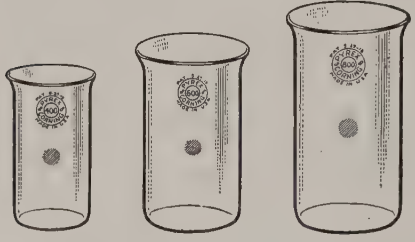
Size No.	1	5	7	8
Diameter, mm	25	52	76	76
Height, mm	76	100	127	177
Each	**$ .16**	**.33**	**.49**	**.60**

BEADS, see Glass Beads.

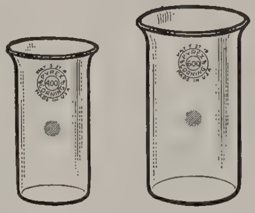
PYREX BEAKERS



2-540



2-545



2-550

IT PAYS TO BUY PYREX BEAKERS IN FULL CASE LOTS

As Distributing Agents for Pyrex Glassware, our stocks are large and we ship your orders for Case Lots promptly, because **no time is lost** in re-packing smaller quantities.

Besides time, you save the factory packing charges and the following discounts:

Full Case Lots	**10%**
50 Case Lots	**10 and 10%**
100 Case Lots	**15 and 10%**

2-540. BEAKERS—PYREX GLASS, Griffin Low Form, with pour-out. These are the popular low-wide shapes, and are supplied on orders where no specifications as to style of beaker are given. Original case lots save 10%.

*Capacity, ml.	30	50	100	150	250	400	600	800
Number of Beakers to a case	216	120	156	156	168	84	72	48
Each	**$ .18**	**.18**	**.19**	**.21**	**.25**	**.30**	**.35**	**.40**

Case lots, 10% discount.

*Capacity, ml.	1000	1500	2000	3000	4000
Number of Beakers to a case	48	24	12	10	10
Each	**$ .54**	**.73**	**.98**	**1.40**	**1.80**

Case lots, 10% discount.

2-545. BEAKERS—PYREX GLASS, High Form, without pour-out; used in electrolytic work, and for other purposes where a beaker without pour-out is more convenient. Original case lots save 10%.

*Capacity, ml.	100	200	300	400	500
Number of Beakers to a case	156	168	120	60	60
Each	**$ .19**	**.23**	**.26**	**.30**	**.32**

Case lots, 10% discount.

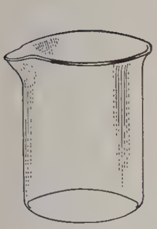
2-550. BEAKERS—PYREX GLASS (Dye Pots), high form, without pour-out; **made of very heavy Pyrex glass.** These dye pots are often preferred to porcelain for general work in the dye laboratory. Original case lots save 10%.

*Capacity, ml.	400	600
Height, mm	150	150
Diameter of rim, mm	85	90
Diameter of body, mm	65	80
Number of Beakers to a case	60	60
Each	**$ .60**	**.70**

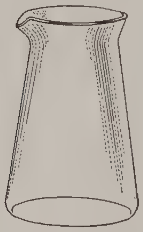
Case lots, 10% discount.

**Sizes adopted by the American Chemical Society, Standardization Committee.*

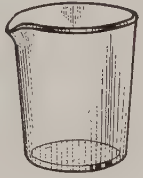
BEAKERS



2-560



2-565



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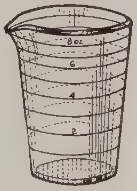

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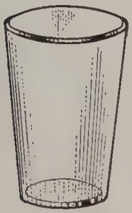

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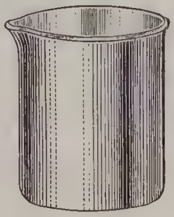

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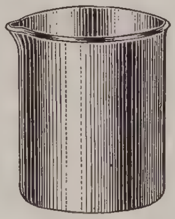


2-590

2-560. BEAKERS, RESISTANCE GLASS, Griffin, Low Form, with pour-out. This is the popular, low-wide shape which is used for most laboratory work. This grade of glass is less expensive, and is often used for students' work, and for operations where the requirements are not so severe.

Capacity, ml.	50	100	150	250	400	600	800	1000	2000
Each	**$ .12**	**.13**	**.14**	**.17**	**.20**	**.23**	**.25**	**.36**	**.75**

In lots of 100 or more, 10% discount.

2-565. BEAKERS, Conical, Resistance Glass, with pour-out; sometimes called Phillips beakers or assay flasks. The shape is lower and wider than that of the usual Erlenmeyer Flasks.

Capacity, ml.	125	250	500
Each	**$ .22**	**.26**	**.33**

2-570. BEAKER, Heavy Glass with pour-out, low wide shape. For general use with cold solutions, not intended to be heated; capacity to pour-out 8 ounces. **Each, $ .20**

Per dozen, 10% discount.

2-575. BEAKER, Heavy Glass, with pressed graduations and pour-out, intended for approximate measuring of cold solutions, not to be heated; capacity 8 ounces, marked off in one ounce divisions. **Each, $ .25**

Per dozen, 10% discount.

2-580. BEAKERS, Heavy Glass, Tumbler Form, without pour-out, used as containers for cold solutions, not intended to be heated.

Capacity to brim, ounces	6	12
Each	**$ .10**	**.15**

Per dozen, 10% discount.

2-585. BEAKERS, Aluminum, Griffin, Low Form, with pour-out. Made of one piece of aluminum.

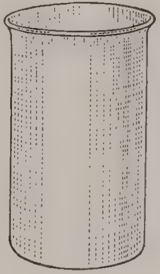
Capacity, ml.	125	250	500	1000
Each	**$ .60**	**.80**	**1.10**	**1.60**

Per dozen, 10% discount.

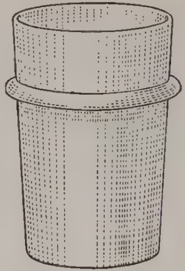
2-590. BEAKERS, Copper, Griffin, Low Form, with pour-out. Made of one piece of copper.

Capacity, ml.	125	250	500	1000
Each	**$ .65**	**.85**	**1.20**	**1.75**

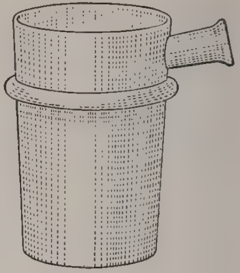
Per dozen, 10% discount.



2-595



2-600



2-605

2-610

2-615

2-618

2-595. BEAKERS, Porcelain, High Form, without pour-out, glazed inside and out, except outside bottom; used extensively as Dye Pots and suitable for other laboratory purposes where porcelain is desired.

Size	A	B	C	D
Capacity, ml.	340	580	700	970
Each	**$ .75**	**.85**	**1.10**	**1.30**

2-600. BEAKERS, Porcelain, Dye Pots, without pour-out, with heavy supporting flange, glazed inside and out, except outside bottom.

Size No.	2	3	4
Capacity to level of flange, ml.	290	425	1125
Each	**$ .85**	**1.30**	**1.95**

2-605. BEAKERS, Porcelain, Dye Pots, without pour-out, with heavy supporting flange and **socket for wooden handle,** glazed inside and out, except outside bottom. Supplied without handles.

Size No.	2	3
Capacity to level of flange, ml.	290	425
Each	**$1.30**	**1.95**

2-610. BEAKER COVERS, Watch Glass Form, of thin glass, well annealed; concave shape with finely ground edges. Made especially for covering beakers when boiling solutions. The glass is thin and well annealed to withstand heat changes. The concave shape prevents the cover from sliding off the beaker, and returns the condensation to the beaker. These covers are also used to cover funnels, dishes, jars, etc.

*Diameter, mm.	25	35	50	65	75	90	100	115	125	150	175	200
Per dozen	**$ .35**	**.40**	**.45**	**.55**	**.70**	**.85**	**.90**	**1.10**	**1.40**	**1.80**	**2.40**	**3.00**

Per gross, 15% discount.

2-615. BEAKER COVER, Watch Glass Form, with 3/8 inch hole in center, to permit stirring contents of beaker without removing the cover; concave shape with edge finely ground; diameter 4 inches.

Each, $ .25
Per dozen, 10% discount.

BEAKER COVERS, Flat Glass Plates, see Plates, Glass.

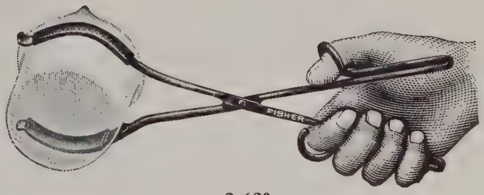
2-618. BEAKER MAT, Absorbent. Made of pressed absorptive paper, 110 mm. diameter, 4 mm. thick. Will absorb a quantity of water equal to 5 times its own weight. Used on the laboratory desk or table for mats on which to place beakers. It protects a hot beaker from coming in contact with a cold table top; it protects the beaker from the mechanical shock and it also protects the table top from chemicals which drip from the spout of the beaker.

Each, $ .05
Per dozen, 10% discount.
Per gross, 20% discount.

BEAKER CLAMPS, see Clamps.

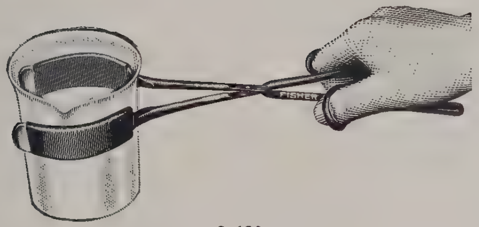
**Sizes adopted by the American Chemical Society, Standardization Committee.*

FISHER SAFETY BEAKER TONG



FIRMLY
GRIPPED

2-620



SAFELY
TIPPED

2-620

2-620. BEAKER TONG, Fisher, Safety. (*Patent applied for.*) **Made of Ascaloy.** The Fisher Safety Beaker Tong is different from any other device of its kind. Many laboratories called our attention to the fact that heretofore there had not been available a satisfactory beaker clamp. The Fisher Safety Beaker Tong was then designed to fulfill the requirements of a device for the convenient and safe handling of beakers containing hot solutions, and for pouring their contents.

The handles extend beyond the finger-holds so that when a beaker is **firmly gripped,** the entire weight is supported by the palm of the hand and not merely by the fingers. The finger-hold and thumb-hold are designed so that the hand is held in its natural position, with the end of the thumb against the outside of its handle. (*See illustration showing the gripping.*)

The jaws of the tongs are one (1) inch wide. They are rubber covered and this, together with the generous width for gripping, permits the beaker to be **safely tipped** without changing its position in the tong. When firmly gripped it cannot slip, and the risk of breakage is reduced to a minimum. The rubber covers for the jaws are replaceable. (*See illustration showing the tipping.*)

Ascaloy. The entire tong is made of Ascaloy, a new stainless iron which is tough and resists bending; will not rust, and is resistant to the action of chemicals. It is a chromium-iron alloy which is stronger and tougher than steel and is not attacked by many of the chemicals which readily attack iron, steel, copper and the non-ferrous alloys. It is practically insoluble in nitric acid, organic acids and the base metal hydroxides, chlorides and sulphates. Ascaloy retains its original polish for a long period.

These tongs are therefore strong and retain their original shape, and they will not rust or corrode.

The Fisher Safety Beaker Tong will firmly grip and safely tip any size Griffin Form Beaker from 100 ml. to 1500 ml. capacity. The tong is 13 inches long over all.

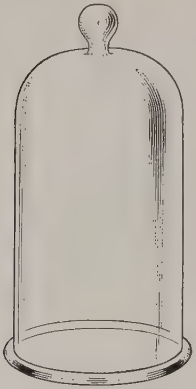
We recommend this tong as the most convenient for handling beakers, also as a good and inexpensive form of accident prevention. **Each, $1.25**

UNDER FISHER PATENTS

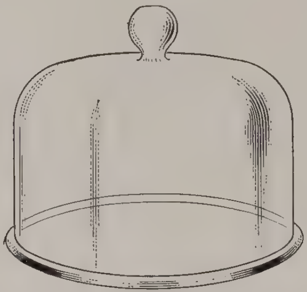
We also make a new tong which we designed especially to safely handle hot evaporating dishes and their contents. This is also made of Ascaloy.

See No. 5-815 on page 190.

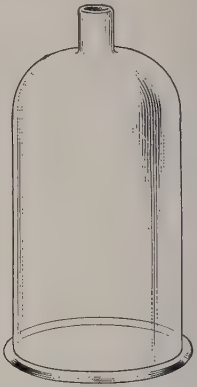
Bell Glasses



2-625



2-630



2-635

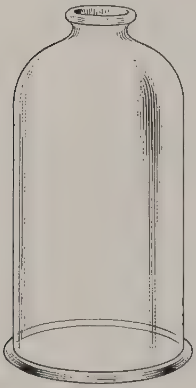
2-625. BELL GLASSES, High Form, with Knob, made of heavy molded glass, with ground rims, to make close contact with a ground glass plate. The larger sizes are often used as covers for microscopes. Size 15x8½ inches will be found convenient for stands F, FF, FFS, etc., and size 18x9 inches suitable for the larger stands CAE, CAS, and DDS. The dimensions are approximate, and are measured inside.

Height inside, inches	9	11	15	15	18
Diameter inside, inches	5	6	7	8½	9
Capacity, approx., gallons	½	1	2	3	4
Each	**$2.80**	**3.75**	**5.00**	**6.25**	**9.00**

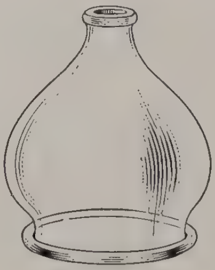
2-630. BELL GLASSES, Low Form, with Knob, made of heavy molded glass, with ground rims.

Height inside, inches	3½	4	5	8	10
Diameter inside, inches	5	6	8	10	12
Each	**$2.25**	**2.50**	**3.50**	**5.75**	**8.50**

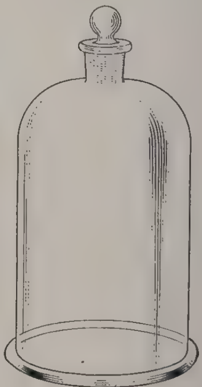
2-635. BELL GLASS, High Form, Open Top, made of heavy molded glass, with ground rim and open top for introducing parts of apparatus. Inside height, 11 inches; inside diameter, 6½ inches; capacity, about one (1) gallon. **Each, $3.75**



2-640



2-645



2-650

2-640. BELL GLASSES, High Form, Wide Open Top, made of heavy molded glass, with ground rim and extra wide tubulature in top. More suitable for some experiments than No. 2-635.

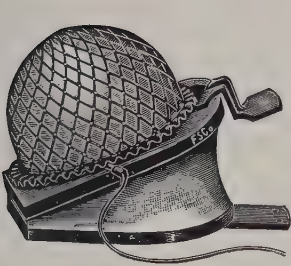
Height inside, inches	9	11
Diameter inside, inches	5	6
Capacity, approx., gallons	½	1
Each	**$3.00**	**4.00**

2-645. BELL GLASS, Low Form, Open Top, made of heavy molded glass, with ground rim; used in making dializers and also as a so-called "Bladder Glass" in experiments showing bursting by atmospheric pressure. Inside height, 8 inches; inside diameter, 5 inches. **Each, $3.00**

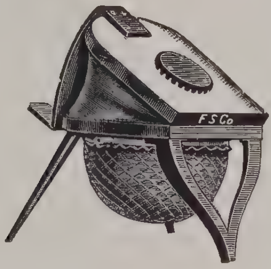
2-650. BELL GLASS, High Form, Glass Stoppered, made of heavy molded glass, with ground rim and ground-in glass stopper. Inside height 11 inches, inside diameter 6 inches; capacity about 1 gallon. **Each, $4.00**

2-655. BLADDERS, Animal; dried ox bladders with necks, prepared and cleaned. For use with Bladder Glasses to show bursting by atmospheric pressure. For "Bladder Glass," see No. 2-645.
Per dozen, assorted sizes, **$2.50**

BLAST APPARATUS, see Air Pumps, also Drying Apparatus.



2-660



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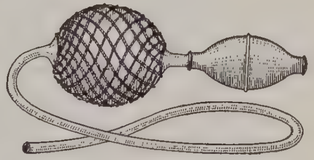


2-680

2-660. BLOWERS, Fletcher, Foot Power, producing a strong, steady air blast for blast lamps, etc., where a mechanical pump is not available. The bellows is strong and the pressure may be increased after adding one or more rubber discs (No. 2-670) to those already on the air reservoir. Strong twine nets prevent the rubber discs from expanding beyond their elastic limit.

Size	A	B
Diameter of reservoir, inches	7¼	9
Max. pressure per sq. in., pounds	1	1½
Each	$9.50	12.50

2-665. BLOWER, Fletcher, Foot Power, mounted on three legs, with air reservoir underneath, otherwise the same as No. 2-660, size B. Diameter of reservoir, **9 inches.** **Each, $14.25**

2-670. BLOWER DISCS, of rubber, for use with Foot Blowers, Nos. 2-660 and 2-665.

Size	A	B
Diameter, inches	9⅛	11½
For reservoir, inches	7¼	9
Each	$ .70	.90

2-675. BLOWER NETS, of heavy twine, for use with Foot Blowers, Nos. 2-660 and 2-665.

Size	A	B
For reservoir, diameter, inches	7¼	9
Each	$ .50	.65

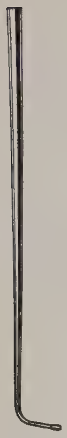
2-680. BLOWER, Hand Power, double bulb, with net. The blower is made of a pure grade of rubber, with outlet tube 24 inches long and length over all, 34 inches. The second bulb acts as a reservoir for delivering the air at a uniform rate; it is encased in a net which prevents it from over-expanding. The capacity is sufficient for use with blowpipes and other small apparatus, where a continuous stream of air at low pressure is desired. **Each, $1.75**

BLOWER, Electric Drying Apparatus, see Drying Apparatus.

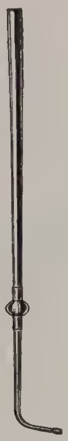
BLOWPIPES, Automatic, see Burners, Blast Lamps.

MECHANICAL BLOWERS

Mechanical Blowers are listed under Air Pumps. See No. 1-060 to No. 1-135, inclusive. For continuous, automatic operation of burners and blast lamps, requiring air pressure, the mechanical blower is much to be preferred. Mechanical blowers are made in various styles and sizes, water power and electrically driven, for the operation of any number of blast burners, from one up.

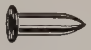


2-685



2-690

2-695



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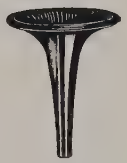
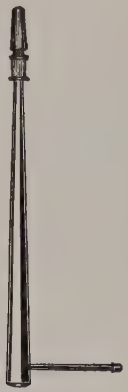
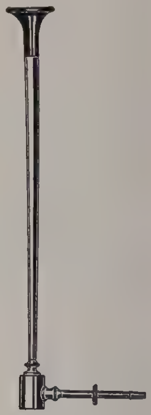


2-700



2-705



2-710

2-685. BLOWPIPES, Plain Form, made of brass and used largely in educational institutions. For mouthpiece, see No. 2-700. Furnished without mouthpiece.

Length over all, inches	8	10
Each	**$ .18**	**.20**

Per dozen, 10% discount.
Per gross, 25% discount.

2-690. BLOWPIPE, with bulb as air chamber, for a more steady flow of air; made of brass, similar to No. 2-685; length over all, 10 inches. For mouthpiece, see No. 2-700. Furnished without mouthpiece. **Each, $ .40**
Per dozen, 10% discount.

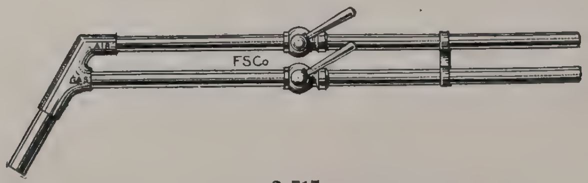
2-695. BLOWPIPE, Black, made of japanned tin, with removable brass tip; length over all, 8½ inches. This style is popular and used to a great extent by educational institutions. For mouthpiece, see No. 2-700. Furnished without mouthpiece. **Each, $ .20**
Per dozen, 10% discount.
Per gross, 25% discount.

2-700. BLOWPIPE MOUTHPIECE, of turned wood, neck made cone-shaped to fit blowpipes 3/16 to 5/16 inch. inside diameter. **Each, $ .15**
Per dozen, 10% discount.
Per gross, 25% discount.

2-705. BLOWPIPE, Black, Improved Form, made of brass, with screw-on tip and flat **wooden mouthpiece;** length over all, 9 inches. **Each, $ .80**

2-710. BLOWPIPE, Plattner, made of nickel-plated brass, with hard rubber mouthpiece and nickel-plated tip; length over all, 9½ inches. **Each, $2.25**

2-715. BLOWPIPE TIP, Platinum, made to fit over the nickel-plated tip on Plattner Blowpipe, No. 2-710. **At market price of platinum**



2-717

2-717. BLOWPIPE, Brazing; made of brass, with separate stopcocks, lever style, for controlling the gas and air. The gas tube is 7/16 inch inside diameter, the air tube is 3/16 inch inside diameter and the blowpipe measures 14 inches long, over all. Its satisfactory operation depends upon a sufficient gas supply, which should be taken from a line at least 3/8 inch inside diameter.

This blowpipe can be easily handled and either the gas or air regulated by the thumb of the hand which holds the blowpipe. **Each, $2.50**

2-720

2-730

2-720. BLOWPIPE ANALYSIS SET, Butler, Portable, arranged by Prof. G. Montague Butler, Dean of the College of Mines and Engineering, University of Arizona; suitable for laboratory or field use. Case is arranged with a separate compartment for each part, thereby breakage is reduced to a minimum. The liquid chemicals are in glass stoppered bottles and the dry ones in tin boxes with sifter tops, all plainly labeled. Complete with wet and dry fluxes, also oil and alcohol for lamps. Outside measurement of case 11¾x6½x2¾ inches. The use of this set is set forth in Handbook No. 2-725.

Complete Equipment consists of:

Blowpipe
Platinum-tipped Forceps
Platinum Wires and Holder
Hammer
Anvil
Combined Charcoal Borer
Magnet and Chisel
Streak Plate
Alcohol Lamp
Oil Lamp
Large Test Tube
Small Test Tube
6 Open Tubes
2 Arsenic Tubes
Blue Litmus
Red Litmus
2 sticks of Charcoal
Ammonium Hydrate
Cobalt Nitrate
Hydrochloric Acid
Sulphuric Acid
Nitric Acid
Tin
Microcosmic Salt
Sodium Carbonate
Bismuth Flux
Borax
Potassium Bisulphate

Set complete, in carrying case, **$35.00**

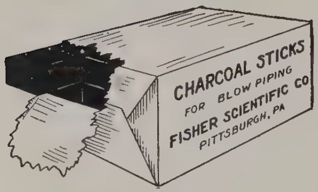
2-725. POCKET HANDBOOK OF BLOWPIPE ANALYSIS, written by Prof. G. Montague Butler, Dean of the College of Mines and Engineering, University of Arizona. Used with Blowpipe Set, No. 2-720 and Mineral Collection No. 2-740. **Each, $1.25**

2-730. BLOWPIPE ANALYSIS SET, Colorado School of Mines Type, selected for individual use in mineralogy classes, for field work; put up in a neat wooden case, with hinged cover, 7½x5¼x3¼ inches.

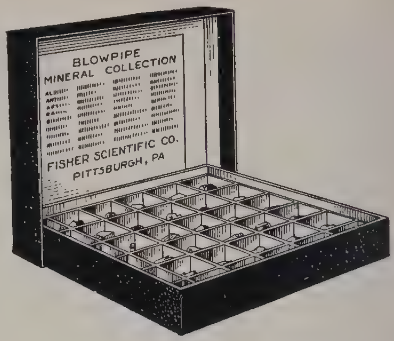
Complete Set consists of the following:

Blowpipe, of brass with bone mouthpiece
Forceps
Hammer
Anvil
Magnet
Oil Lamp
Large Test Tube
Small Test Tube
Porcelain Streak Plate
6 Arsenic Tubes
2 Charcoal Sticks
Turmeric Test Paper
Potassium Bisulphate
Microcosmic Salt
Borax
Sodium Carbonate
Bismuth Flux
Cobalt Nitrate
Ammonium Hydrate
Hydrochloric Acid
Nitric Acid
Sulphuric Acid

Set complete, in case, $10.00



2-735



2-740

2-735. BLOWPIPE CHARCOAL STICKS, made of a fine grade of willow charcoal, especially for blowpipe work. Size of sticks, 20x25x100 mm.; put up in packages of one dozen sticks.

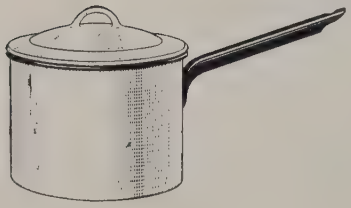
Per dozen (1 package) $ .95

Per gross (12 packages), 15% discount.

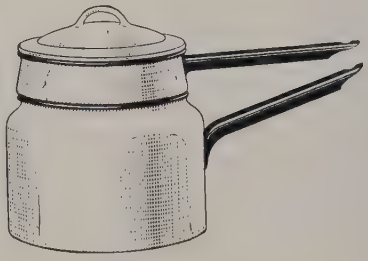
2-740. BLOWPIPE MINERAL COLLECTIONS, Butler, consisting of mineral specimens approved by Prof. G. M. Butler as illustrating his book (No. 2-725) **Pocket Handbook of Blowpipe Analysis.** Each specimen has its individual tray, and is numbered for reference to the list of names on the inside cover. The case is of pasteboard, covered with black cloth.

Number of specimens	35	49
Per set	**$3.75**	**5.25**

BLOWPIPE MINERALS, sold by weight. We can supply a large variety of minerals for blowpipe and laboratory experiments which can be bought in such quantities as desired. **Prices upon application.**



2-745



2-750

2-745. BOILERS, Single, White Enameled, with white enameled covers; made of seamless steel, straight sides; enameled with three coats of acid-proof white enamel, trimmed in blue. These boilers are suitable for many laboratory purposes, including the preparation of culture media and their appearance is in keeping with the laboratory.

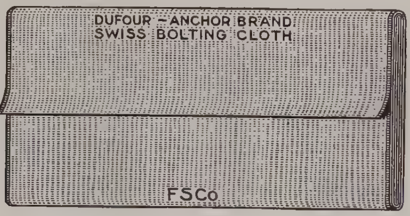
Capacity, approx., quarts	2	3¾
Diameter, inches	6¼	7¾
Depth, inches	4½	5½
Each	**$1.25**	**2.00**

2-750. BOILERS, Double, White Enameled, with white enameled covers; made of seamless steel; enameled with three coats of acid-proof white enamel, trimmed in blue. Water is placed in the lower chamber and the material to be heated in the upper one. The steam heats without scorching.

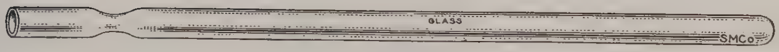
The white enameled cover fits both upper and lower chambers so that either part can be used separately as a single boiler.

Capacity, upper chamber, approx., quarts	1¾	3½
Diameter, upper chamber, inches	6¼	7½
Each	**$2.30**	**3.75**

BOMBS, Calorimeter, see Calorimeters.



2-755



7-630

2-755. BOLTING CLOTH, Dufour—Anchor Brand. This is the genuine Swiss bolting cloth used for making sieves. It is manufactured from pure silk of "standard" weight and is 40 inches wide (any length may be purchased but the width must be 40 inches).

Number	7	8	9	10
Meshes per linear inch	82	86	97	109
Per linear yard, 40 in. wide	**$ 5.30**	**5.85**	**6.30**	**6.90**
Number	11	12	13	14
Meshes per linear inch	116	125	129	139
Per linear yard, 40 in. wide	**$ 7.25**	**7.80**	**8.10**	**8.55**
Number	15	16	17	18
Meshes per linear inch	150	157	163	166
Per linear yard, 40 in. wide	**$ 9.05**	**10.05**	**11.25**	**13.50**
Number	19	20	21	25
Meshes per linear inch	169	173	178	200
Per linear yard, 40 in. wide	**$15.20**	**16.80**	**18.00**	**21.00**

7-630. BOMB TUBE, Carius, Glass. Made of heavy wall lime glass, closed at one end with **constriction for sealing** at the other. Used for the determination of sulphur or halogens in organic compounds according to the method of Carius.

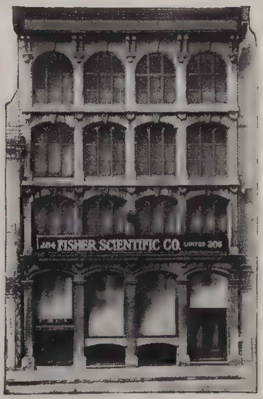
Length, over all, 700 mm. Length to constriction, 615 mm. Outside diameter, 22 mm. **Each, $1.00**

TO SERVE CANADIAN LABORATORIES

The Fisher Scientific Company, Limited, 204-206 McGill Street, Montreal, is a Canadian corporation, which cooperates with the Pittsburgh house.

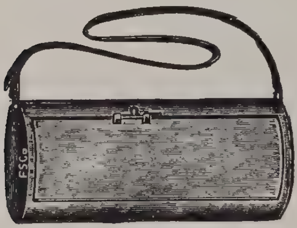
Canadian laboratories can obtain the standardized apparatus and the reagents listed in this catalogue, directly from the Montreal warehouse.

Special glass apparatus is made to specifications, in the Glass Blowing Shop located on the premises. Repair work is done promptly in this same shop.

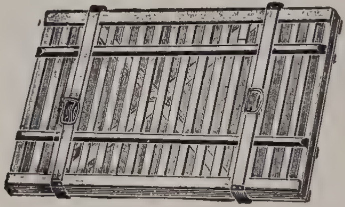


OUR MONTREAL WAREHOUSE
204-206 McGill St.

BOTANICAL SUPPLIES



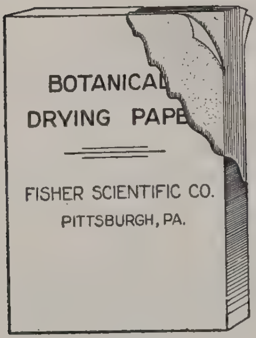
2-760



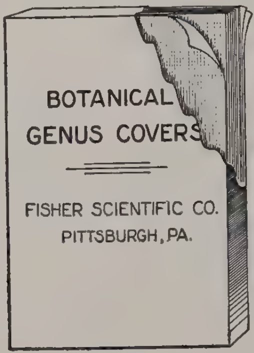
2-765

2-760. BOTANICAL COLLECTING CASE, Vasculum, with shoulder strap; used in collecting botanical specimens in the field. The case is made of light sheet metal so that it is not heavy to carry, is enameled inside and out to prevent rusting and has a long door, with catch, so that specimens may be put in without crushing. The approximate dimensions are 16x6x4½ inches. **Each, $4.50**

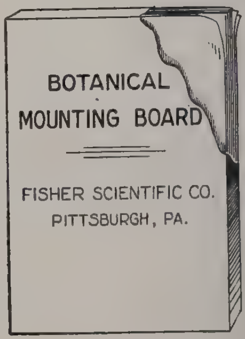
2-765. BOTANICAL DRIER, Plant Press, Portable, of simple lattice work design; made of wood, 12 inches wide and about 17 inches long, complete with driers and straps. When hung in the sunlight or over a heater, the specimens may be dried so rapidly that the natural colors are preserved. **Each, $3.00**


BOTANICAL
DRYING PAPE
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

2-770


BOTANICAL
GENUS COVERS
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

2-775


BOTANICAL
MOUNTING BOARD
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

2-780

2-770. BOTANICAL DRYING PAPER, a good blotting paper, selected for its quick absorbing quality in drying botanical specimens; size 12x17 inches. This is the proper absorption paper to use in plant presses similar to No. 2-765.

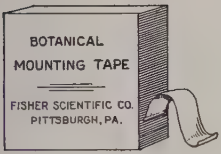
Per 25 sheets,	**$1.25**
Per 100 sheets,	**4.00**

2-775. BOTANICAL GENUS COVERS, made of heavy, tough, Manilla paper, with smooth surface, suitable for writing upon; size, when folded, 12x18 inches.

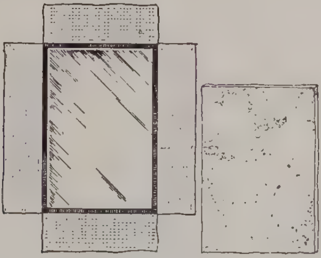
Per 25 covers,	**$1.00**
Per 100 covers,	**3.00**

2-780. BOTANICAL MOUNTING BOARD, made from two-ply Bristol board; recommended for its pure white color, smooth surface, and suitable stiffness for supporting the specimen; size 11x17 inches.

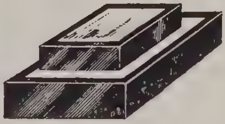
Per 25 boards,	**$1.00**
Per 100 boards,	**3.00**


BOTANICAL
MOUNTING TAPE
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

2-785



2-790



2-795

2-785. BOTANICAL MOUNTING TAPE, White Gummed Cloth, in rolls 10 yards long and ¾ inch wide; put up in a slotted cardboard box, which keeps the unused part clean and enables the tape to be withdrawn and moistened, as desired. **Per box, $ .40**

2-790. BOTANICAL MOUNTS, Riker, for thin specimens, made of selected glass plates to which are attached flaps of linen Morocco paper. The cardboard back is provided with a layer of prepared cotton, in which the specimen is embedded. After moistening and pasting down the flaps, the mounts are dustproof. The total thickness is about ¼ inch.

Width, inches	5	6½	8	12
Length, inches	6	8½	12	16
Each	**$ .30**	**.40**	**.75**	**1.20**

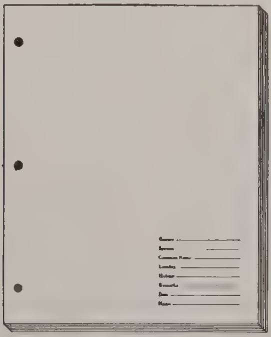
Per dozen, 10% discount.

2-795. BOTANICAL MOUNTS, Riker, for thick specimens, similar in construction to No. 2-790, but made to exhibit plants with thick roots or stems. These mounts are also suitable for beetles, butterflies, etc. The total thickness is about one inch.

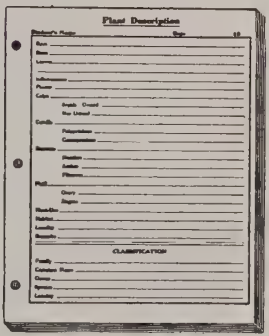
Width, inches	5	6½	8	12
Length, inches	6	8½	12	16
Each	**$ .40**	**.50**	**.85**	**1.50**

Per dozen, 10% discount.

2-800



2-805



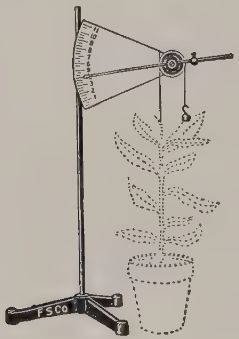
2-810

2-800. HERBARIUM, for Plant Collections, complete with 25 loose herbarium sheets, index and hints for collecting specimens. The portfolio form permits arranging the specimens scientifically according to the genera and families to which they belong. The loose leaf method is convenient for adding to, or removing specimens from, the collection at any time. Size 11x17 inches. **Each, $1.00**
Per dozen, 10% discount.

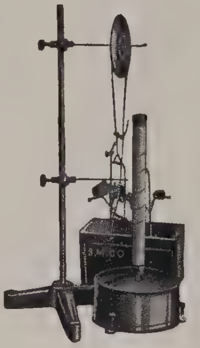
2-805. HERBARIUM SHEETS, 11x17 inches; to fit No. 2-800 Herbarium. Put up in packages of 100 sheets.
Per package (100 sheets), $2.50

2-810. PLANT DESCRIPTION SHEETS, with space for the complete analysis of a plant; printed on heavy paper; size 11x17 inches; to fit No. 2-800 Herbarium. Put up in packages of 100 sheets.
Per package (100 sheets), $2.50

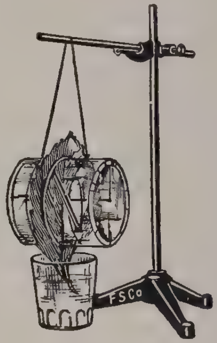
PLANT PHYSIOLOGY APPARATUS.



2-815



2-820



2-825

Plant Physiology, which has been aptly defined as, "The Physics and Chemistry of plant life," concerns itself with the interesting question: **How Do Plants Work?** That question the plant itself will answer, visibly and convincingly, with the aid of the following apparatus designed by such Plant Physiologists as Messrs. Detmer, Ganong and Osterhout.

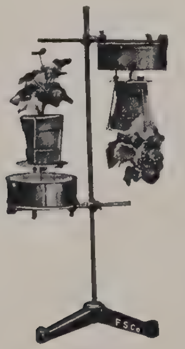
For further data, see the following:

Bergen and Davis, *Principles of Botany*
Coulter, *Plant Structures*
Detmer, *Practical Plant Physiology*
Ganong, *The Living Plant*
Gray, *Manual of Botany*, Seventh Edition
Osterhout, *Experiments with Plants*
Sachs, *History of Botany*
Schimper, *Plant Geography*
Ganong, *Laboratory Course in Plant Physiology*

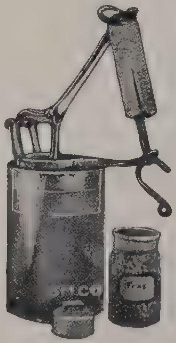
2-815. **AUXANOMETER, Simple Design,** for measuring the growth of plants. A silk thread, attached to the plant, passes over a pulley, and is held in close contact by a weight. The pointer, attached to the pulley, indicates the growth on the scale, which is calibrated to read in 0.01 of an inch. The height of the Auxanometer, on the tripod support, can be adjusted for various sized plants. **Each, $10.00**

2-820. **AUXANOMETER, Self Recording,** a precision instrument for accurately measuring the growth of plants. As the plant grows, the glass pen is gradually lowered and the growth is recorded on the revolving cylinder. This upright cylinder is rotated by an eight-day clock movement, which has a revolving period ample for slow growing plants. The oxidized metal case is mounted on a mahogany base, with leveling screws. Supplied complete with tripod support. **Each, $35.00**

2-825. **AWN HYGROMETER, Darwin,** for demonstrating the loss of moisture from a leaf surface. The comparative rate of loss from both sides of a leaf is shown directly. The illustration shows a cut leaf in a glass of water, but even better results are obtained from a leaf in natural growth. Supplied complete on stand, with supporting rod. **Each, $7.50**



2-830



2-835

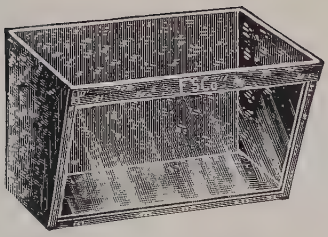
2-830. **CLINOSTAT, Cambridge,** for studying the direction of growth of plant roots, and whether they are affected by gravity. This Clinostat is made for quantitative demonstration and for research work.

The revolving device is the mechanism of a specially designed eight-day clock; mounted in an oxidized metal case. The dial is made of lacquered brass. The base has legs for horizontal work and bosses for attaching to the universal stand, which can be quickly changed to any desired position within the radius of a circle. (The illustration shows two positions.) Supplied complete with tripod support. **Each, $38.00**

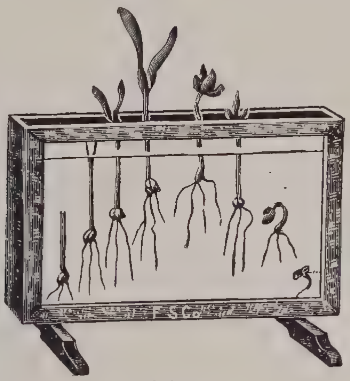
2-835. **DYNAMOMETER, for Seeds,** to measure the enormous force exerted by swelling seeds. With a handful of peas, the pressure, upwards, can be shown equal to 150 pounds. This can also be computed in pounds per square inch.

Supplied complete with glass stoppered bottle and scale to register the force exerted. **Each, $4.25**

PLANT PHYSIOLOGY APPARATUS



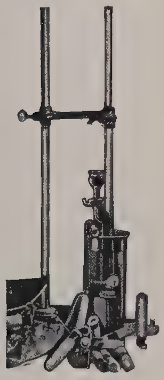
2-840



2-845

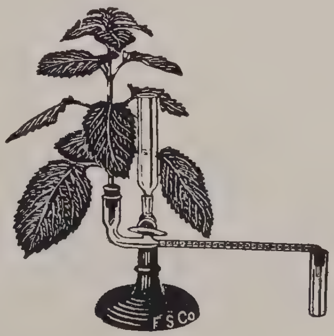
2-840. GERMINATION BOX, Ganong, for demonstrating whether the direction of growth of the primary root and the primary stem are guided by external, or internal influences. Made of galvanized iron with slanting glass front. The germinating box is 5 inches deep, and measures 8x5 inches at the top, and 6x4 inches at the bottom. A removable metal shield is provided to keep out the light except when it is desired to examine the contents of the box. **Each, $3.00**

2-845. GERMINATION BOX, U. S. Dept. of Agriculture, for demonstrating the proper depth to plant seeds. Several seeds are planted at various depths, and their progress during germination and growth is easily followed by observation through the glass front and rear. The frame is made of galvanized iron, is 15 inches wide and 8 inches deep, with the front and rear glass sides ¾ of an inch apart. Removable metal shields are supplied to keep out the light except when it is desired to observe the seeds. *See Farmers' Bulletin No. 218, U. S. Dept. of Agriculture.* **Each, $4.00**



2-850

2-855



2-860

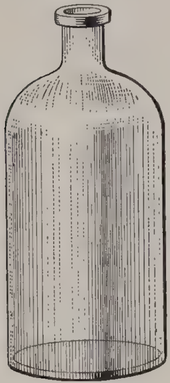
2-850. OSMOMETER, Freas, to demonstrate the osmotic pressure exerted on account of the absorption of water by the roots of a plant. This osmometer operates quickly and the liquid will rise in the glass tube during the time of one laboratory period. The glass stopcock releases the pressure and resets the instrument at zero. Supplied complete with glass jar, support and one diffusion shell. **Each, $8.50**

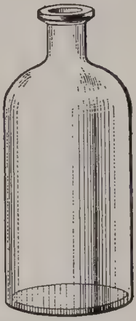
2-855. DIFFUSION SHELL, for No. 2-850 Osmometer. **Each, $1.00**

2-860. POTOMETER, Smith College, for the quantitative determination of the transpiration rate of plants by measuring the water absorbed by a cut shoot. The reservoir is made of glass, with a glass stopcock to regulate filling. The horizontal tube is of small diameter and finely graduated. A sliding rubber ring closes the side inlet. Mounted on a substantial base. **Each, $8.00**

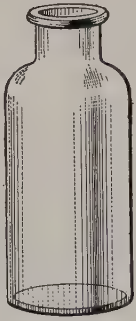
BOTTLES

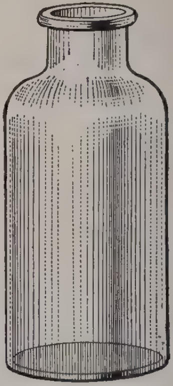
See foot of page 83


2-885


2-880

2-900


2-890


2-895

SPECIAL ATTENTION is directed to the **BIG SAVING** in buying bottles in **ORIGINAL CASE LOTS.** Bottles are bulky, but inexpensive; and the packing costs high in proportion to their value. By buying in original case lots, the extra packing cost is avoided and this effects a saving of **30% for usual Cork Stoppered Bottles,** and **25% for usual Glass Stoppered Bottles.**

The styles and sizes of bottles offered are those selected after a study of laboratory needs and the recommendations of the American Chemical Society, Standardization Committee.

2-880. BOTTLES, Narrow Mouth, for Corks, flint glass, for general use. Original case lots save 30%.

Capacity, ounces	½	1	2	4	6	8	12	16	32
Number gross to case	5	5	5	3	2	1½	1	1	½
Per dozen	**$ .50**	**.55**	**.60**	**.80**	**.90**	**1.00**	**1.20**	**1.40**	**2.00**

Original case lots, 30% discount.

2-885. BOTTLES, Narrow Mouth, for Corks, green glass, for storage purposes. Original case lots save 30%.

Capacity, gallons	½	1	2	5
Number dozen to case	3	2	1	½
Each	**$ .35**	**.55**	**1.75**	**2.25**

Original case lots 30% discount.

2-890. BOTTLES, Wide Mouth, for Corks, flint glass, for general use. Original case lots save 30%.

Capacity, ounces	½	1	2	4	6	8	12	16	32
Number gross to case	5	6	5	3	2	2	1	1	⅔
Per dozen	**$ .50**	**.55**	**.60**	**.80**	**.90**	**1.00**	**1.20**	**1.40**	**2.00**

Original case lots, 30% discount.

2-895. BOTTLES, Wide Mouth, for Corks, green glass, for storage purposes. Original case lots save 30%.

Capacity, gallons	½	1	2	5
Number dozen to case	3	2	1	½
Each	**$ .50**	**.75**	**1.75**	**2.50**

Original case lots, 30% discount.

2-900. BOTTLES, Low, Wide Shape, for Corks, of clear flint glass. These bottles are used by many laboratories for transferring samples of materials to be analyzed. Another use is that of low priced specimen jars. Original case lots save 30%.

Capacity, ounces	1	2	3	4
Number gross to case	5	3	2	2
Per dozen	**$ .65**	**.70**	**.80**	**1.05**

Original case lots, 30% discount

BOTTLE CORKS, see Corks.

METRIC SHELF BOTTLES

2-905

2-905. BOTTLES, Metric Shelf Bottles, Narrow Mouth, Glass Stoppered. These are the ideal shelf bottles for laboratory use, and we recommend them because of the following outstanding characteristics:

Shape and Capacity: Low, wide shaped molds are used in the manufacture of these bottles, which give them a distinctive appearance. Each bottle will contain the full metric capacity listed.

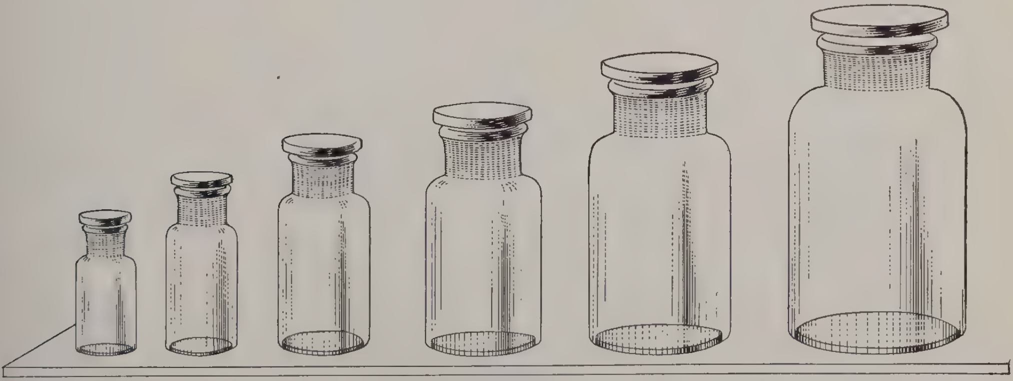
Flat Headed Stoppers: The flat heads enable the stoppers to be placed upside down on a table, without their toppling over, and subsequent contamination. Each stopper is ground to fit the individual bottle to which it belongs. The heads of the stoppers extend beyond the necks of the bottles, and protect them from dust.

Quality of Glass: "Reagent Glass" is used in making these bottles. It is the same glass that is used in making the Lettered Reagent Bottles, and is more resistant to the action of chemicals than the Flint Glass which is used in other bottles. This glass shows no free alkali, and has a brilliant finish which adds to the appearance of the bottles.

For Laboratory Purposes: The low, wide, shape of the bottles, their resistant quality, brilliant finish and metric capacities, together with the style of stopper, all combine to make these bottles most satisfactory for laboratory purposes. Original case lots save 25%.

Capacity, ml.	60	125	250	500	1000	2000	4000
Number to case	150	100	100	100	50	30	15
Each	**$ .26**	**.35**	**.45**	**.55**	**.90**	**1.50**	**2.90**

Original case lots, 25% discount.

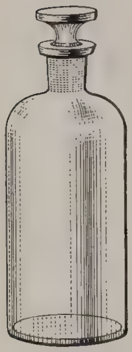


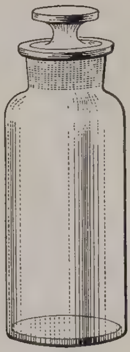
2-910

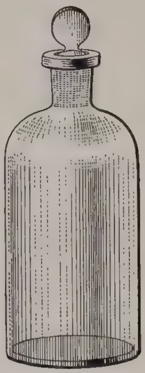
2-910. BOTTLES, Metric Shelf Bottles, Wide Mouth, Glass Stoppered. These bottles have wide mouths for use with dry salts. The shape, quality of glass, finish and metric capacities, as well as the style of the glass stopper, are similar to the No. 2-905 Bottles. Original case lots save 25%.

Capacity, ml.	60	125	250	500	1000	2000
Number to case	150	100	100	100	50	30
Each	**$ .30**	**.36**	**.45**	**.60**	**.95**	**1.55**

Original case lots, 25% discount.


2-915


2-920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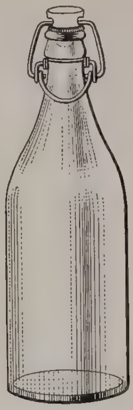
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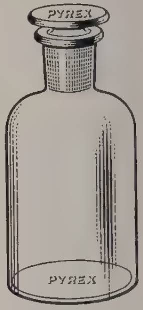


2-940

2-915. BOTTLES, Narrow Mouth, Mushroom Glass Stoppers. Made of clear flint glass, usual shape, with stoppers ground to fit. Original case lots save 25%.

Capacity, ounces	1	2	4	8	16	32
Number gross to case	6	5	3	2	1	½
Per dozen	**$2.35**	**2.60**	**3.15**	**4.00**	**5.65**	**7.90**

Original case lots, 25% discount.

Capacity, gallons	½	1	2	3
Number to case	36	18	6	4
Each	**$1.20**	**2.45**	**4.40**	**8.30**

Original case lots, 25% discount.

2-920. BOTTLES, Wide Mouth, Mushroom Glass Stoppers. Made of clear flint glass, usual shape, with stoppers ground to fit. Original case lots save 25%.

Capacity, ounces	1	2	4	8	16	32	64
Number gross to case	6	5	3	2	1	½	⅓
Per dozen	**$2.35**	**2.60**	**3.15**	**4.00**	**5.65**	**7.90**	**Each, 1.20**

Original case lots, 25% discount.

2-925. BOTTLES, Narrow Mouth, Coin-Shape, Glass Stoppers. Made of green glass, which is less corrosive than flint glass, and well adapted for acids; with stoppers ground to fit. Original case lots save 25%.

Capacity, ounces	16	32	gals.	½	1	2
Number dozen to case	12	6		3	2	1
Per dozen	**$4.40**	**6.00**	**Each**	**.70**	**.90**	**3.15**

Original case lots, 25% discount.

2-930. BOTTLES, Narrow Mouth, Patent Stopper. Made of clear glass, with permanently attached porcelain stoppers which clamp on, making a tight fit by means of a rubber washer which is renewable; particularly adapted for transporting liquids. The 14-ounce size is often used for Water Samples, and the 28-ounce size for By-Products Samples. Original case lots save 25%.

Capacity, ounces	14	28
Number dozen to case	12	6
Per dozen	**$1.75**	**2.60**

Original case lots, 25% discount.

2-935. RUBBER WASHERS, for No. 2-930 Bottles; same size of washer fits both sizes of bottles.
Per dozen, $ .15 **Per gross, 1.50**

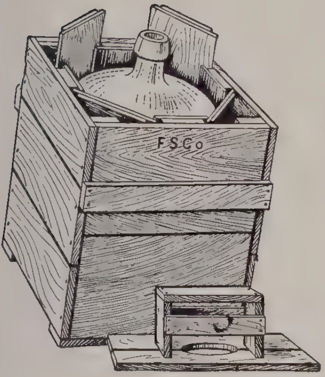
BOTTLES, Wide Mouth, Patent Stopper, See Jars, page 418.

2-940. BOTTLES, Pyrex Glass, Low Wide Form, Flat-Headed Glass Stoppers. Used as containers for serums, vaccines, colloidal and Carrel-Dakin solutions, as well as for conductivity water, double-distilled water for intravenous injections, and for similar purposes where the free alkali in ordinary glass bottles contaminates the contents.

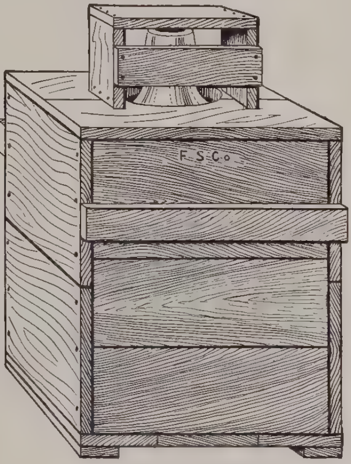
These bottles are well adapted for use in shaking machines where mechanical strength is required and for all purposes involving sterilization by means of hot air or steam.

Capacity, ml.	125	250	500	1000	2000	4000
Number to case	50	50	50	30	20	10
Each	**$ .85**	**1.05**	**1.40**	**1.90**	**2.50**	**3.90**

Original case lots, 10% discount.



2-950 (Top Removed)



2-950

2-955

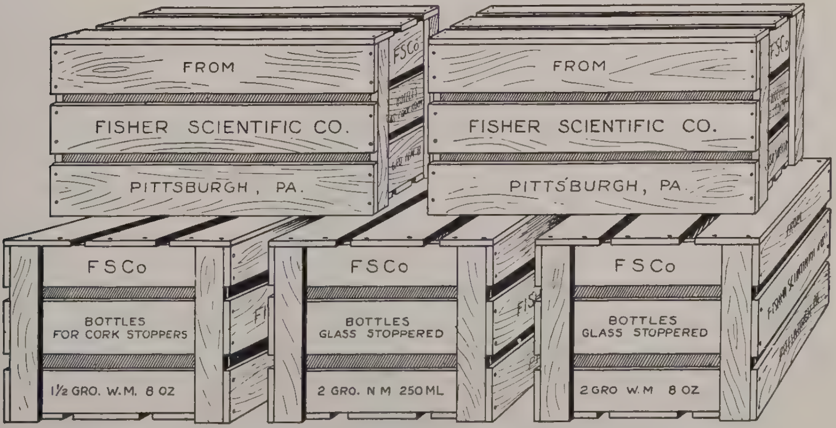
2-950. BOTTLES, Carboys, Boxed, of heavy glass. With the new improved "wooden packing," which supersedes the old fashioned hay packing and complies with the Interstate Commerce Commission's specifications for shipments of inflammable or dangerous liquids, except where mineral wool packing is necessary. By removing the collar, which acts as a top cover for the box, the bottle as well as the wooden packing may be taken out with little effort. A wooden hood protects the neck of the carboy in shipment.

Both the 5 gal. and the 12 gal. carboys are packed in a similar manner. The illustration on the left, shows the carboy with the top of the box removed and the method of inserting the four corner-boards.

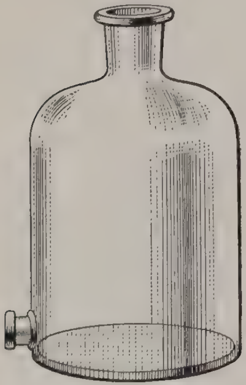
Capacity, gallons	5	12
Weight complete, pounds	40	73
Each	**$4.25**	**10.00**

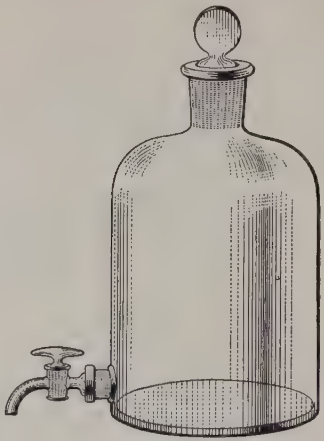
2-955. BOTTLES, Demijohns, Wicker Covered. Made of heavy glass, with woven wicker jackets and handles for protection against breakage and easy handling of large quantities of dangerous or other liquids. The wicker, covering the bottom of the Demijohn, is extra heavy.

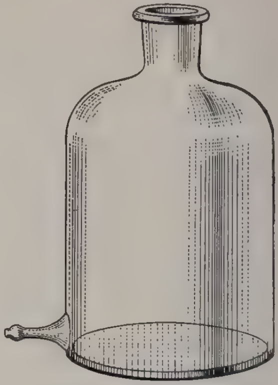
Capacity, gallons	2	5
Each	**$2.25**	**3.75**



ORIGINAL CASE LOTS SAVE MONEY


2-960


2-965


2-970

BOTTLES, Ampoule Form, see Ampoules.

2-960. BOTTLES, Aspirator, with Tubulature, of heavy clear glass. The liquid flows through a glass tube inserted in a rubber stopper placed in the outlet. Furnished without glass tube or rubber stopper.

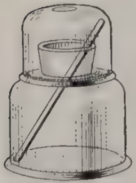
*Capacity, liters	2	4	8	12	20
Each	**$1.75**	**3.00**	**5.25**	**9.00**	**15.00**

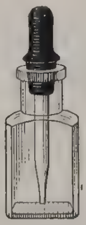
2-965. BOTTLES, Aspirator, with Glass Stopcock and Stopper. Made of heavy clear glass similar to No. 2-960, with glass stopper ground to fit, and glass stopcock ground into the outlet.

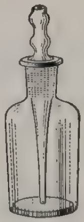
*Capacity, liters	1	2	4	8	12	20
Each	**$3.75**	**5.00**	**6.75**	**11.00**	**16.00**	**25.00**

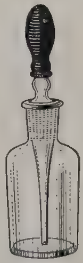
2-970. BOTTLES, Aspirator, with Rubber Tubing Connection. Made of heavy clear glass; the smaller sizes are used extensively as Leveling Bottles with Gas Analysis. These bottles are used in many different ways in assembling laboratory apparatus for various purposes. Supplied without rubber tubing.

*Capacity, cc	125	250	500	**liters** 1	2	4	8
Each	**$ .80**	**.90**	**1.00**	**1.45**	**2.15**	**3.50**	**6.25**


2-975


2-980


2-985


2-990

2-975. BOTTLE, Balsam. Capacity 45 ml. Made of heavy molded glass, with glass cover ground on; supplied with glass rod; used in microscopic work.
Each, $ .50
Per dozen, 15% discount.

2-980. BOTTLE, Dropping, Barnes; capacity 30 ml. A square bottle of clear glass, with glass pipette inserted into a rubber bulb which forms the stopper. This Dropping Bottle has proven very popular because of its low price and practicability.
Each, $ .15
Per dozen, 20% discount.

2-985. BOTTLES, Dropping, with Finger Pipette; a round glass bottle, with ground-in glass pipette to be controlled by the finger.

*Capacity, ml	30	60
Each	**$ .45**	**.50**

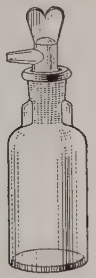
Per dozen, 15% discount.

2-990. BOTTLES, Dropping, with Rubber Bulb. Similar to No. 2-985, but arranged so that the pipette is controlled by a rubber bulb.

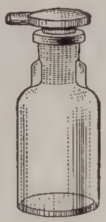
*Capacity, ml	30	60
Each	**$ .50**	**.55**

Per dozen, 15% discount.

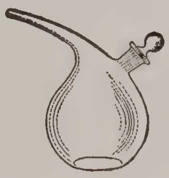
**Sizes adopted by the American Chemical Society, Standardization Committee.*



2-995



3-000



3-005

2-995. BOTTLES, Dropping, T.K. High Stopper. A round, clear glass bottle, designed to deliver the contents drop by drop; with channel in stopper to regulate the rate of flow; the glass stopper is ground to fit and a slight turn from the channel, hermetically seals the bottle.

Capacity, ml	30	60	125
Each	**$ .45**	**.50**	**.60**

Per dozen, 15% discount.

3-000. BOTTLES, Dropping, T.K. Flat Stopper. Similar to No. 2-995 in construction, with flat-head glass stopper which overlaps the neck of the bottle and protects it from dust.

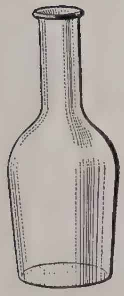
Capacity, ml	30	60	125	200
Each	**$ .45**	**.50**	**.60**	**.75**

Per dozen, 15% discount.

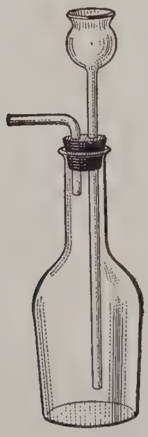
3-005. BOTTLE, Dropping, Schuster. Made of lamp blown glass with glass stopper ground to fit, capacity **30 ml.**

Each, $ .45

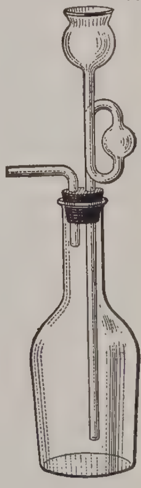
Per dozen, 15% discount.



3-010



3-015



3-020

3-010. BOTTLES, Gas Generating. Made of moderately heavy glass; designed for generating gases.

*Capacity, ml	250	500	1000
Each	**$ .35**	**.55**	**.80**

Per dozen, 15% discount.

3-015. BOTTLES, Gas Generating, with Fittings. Similar to No. 3-010, fitted with rubber stopper, thistle tube for introducing the acid, and a glass "L" tube for taking off the gas.

*Capacity, ml	250	500	1000
Each	**$ .60**	**.85**	**1.10**

Per dozen, 15% discount.

3-020. BOTTLES, Gas Generating, with Safety Trap. Similar to No. 3-015, with bulb-trap in thistle tube to prevent the gas from escaping through this tube.

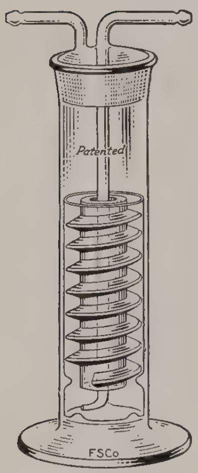
*Capacity, ml	250	500	1000
Each	**$ .85**	**1.10**	**1.35**

Per dozen, 15% discount.

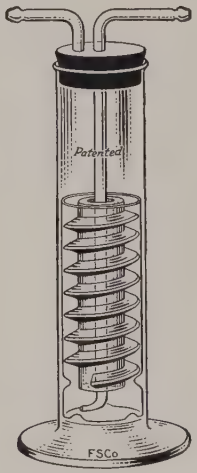
**Sizes adopted by the American Chemical Society, Standardization Committee.*

GAS WASHING BOTTLES

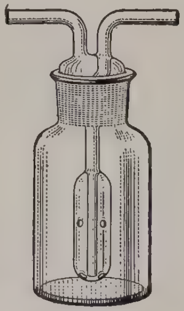
(For other styles of Gas Washing Bottles, see page 293)



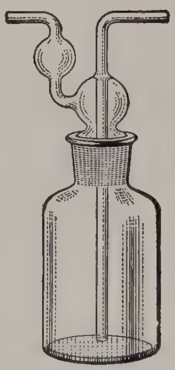
7-505



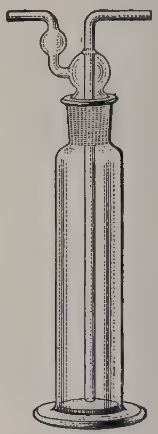
7-510
See also No. 7-512



3-025



3-030



3-035

7-505. BOTTLE, Gas Washing, Milligan, Glass Stoppered. (*Patented February, 1925*), developed by Dr. Lowell H. Milligan while working in the research department of Cornell University. It is 9 inches high and has the absorbing power of a bottle 43 inches high.

The jar contains a glass spiral around which the gas bubbles travel eight (8) times before reaching the top of the spiral. The bubbles then pass through a three-inch settling chamber at the top where any liquid mechanically entrained, settles out. A close fitting shield around the spiral makes it impossible for the bubbles to rise until they have traversed the entire spiral.

The spiral is hollow and open at both ends and the travel of the bubbles causes quite a complete circulation of the solution, upward around the spiral and downward through the middle of it; there is also a downward circulation of the solution outside the shield.

This absorbing bottle can be used for more rapid and more complete absorption; it also replaces larger bottles or it can be used where from two (2) to five (5) bottles were used in series to effect complete absorption. **Each, $5.00**

7-510. BOTTLE, Gas Washing, Milligan, Rubber Stoppered. (*Patented February 1925.*) This bottle is similar to No. 7-505 excepting that it has a rubber stopper instead of a ground glass stopper. It can be used for most of the gas absorptions usually made, and should be used where liquids are employed which tend to "freeze" glass stoppers. **Each, $3.50**

7-512. BOTTLE, Gas Washing, Milligan, Cork Stoppered. Same as No. 7-510, but provided with a cork stopper for use in absorptions such as light oils, etc. which attack rubber stoppers. **Each, $3.50**

3-025. BOTTLES, Gas Washing, Allihn. Made of clear flint glass, with inlet and outlet tubes sealed in the glass stopper. The stopper is ground to fit the neck of the bottle, and the inner construction is designed to produce circulation of the liquid.

Capacity, ml	250	500
Height of Bottle alone, mm	140	165
Each	**$3.00**	**3.75**

3-030. BOTTLES, Gas Washing, Drechsel, Low Form. Made of clear flint glass, with inlet and outlet tubes sealed in the glass stopper, which is ground to fit the neck of the bottle.

Capacity, ml	125	250	500
Height of Bottle alone, mm	105	140	165
Each	**$2.00**	**2.25**	**2.75**

Per dozen, 15% discount.

3-035. BOTTLES, Gas Washing, Drechsel, High Form. Made of clear flint glass, with inlet and outlet tubes sealed in the glass stopper, which is ground to fit the neck of the bottle; with heavy cylinder base.

Capacity, ml	125	250	500
Height of Bottle alone, mm	175	235	280
Each	**$2.00**	**2.25**	**2.75**

3-065

3-070

3-075

3-080

3-065. BOTTLES, Hydrofluoric Acid. Made of **hard rubber,** including the screw cap; used for containing corrosive liquids.

Capacity, ounces	4	8	16
Each	**$1.00**	**1.30**	**1.70**

3-070. BOTTLES, Leveling, with nipple for rubber tubing connection. Made of heavy, clear flint glass, used extensively with Gas Analysis Apparatus. For this style in larger sizes, see No. 2-970.

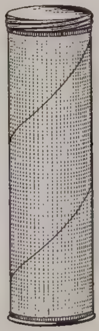
Capacity, ml	125	250	500
Each	**$ .80**	**.90**	**1.00**

3-075. BOTTLE, Insect, Cyanide, Extra Wide Mouth. Made of clear flint glass; capacity 170 ml., height 85 mm., inside diameter of neck 40 mm., diameter of bottle 65 mm. **Each, $ .20**
Per dozen, $2.00

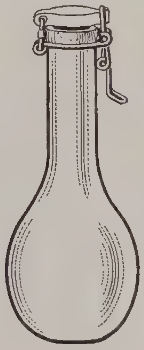
3-080. BOTTLE, Microscopic Immersion Oil. Made of clear flint glass, with inside glass tube to prevent rapid evaporation, capacity about 10 ml. The heavy metal cap is nickel-plated and loose fitting. The polished bone dropping rod is finely pointed, so that only a very small drop of oil may be obtained at one time, and is attached to the metal cap by means of an elastic spring to insure flexibility and avoid scratching the objective. Used to place the oil on Microscope Objectives. **Each, $1.60**

3-085

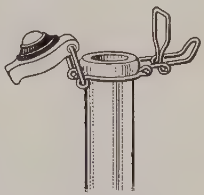
3-090



3-095



3-100



Showing special stopper of No. 3-100

3-085. BOTTLES, Oil Sample. Made of clear flint glass especially for sampling oil and other liquids. The dimensions of these bottles are standard, which enables one to judge the relative appearance of different samples.

*Capacity, ounces	2	4	8
Number to the case, gross	5	3	1
Per dozen	**$1.10**	**1.60**	**2.75**

Original case lots, 25% discount.

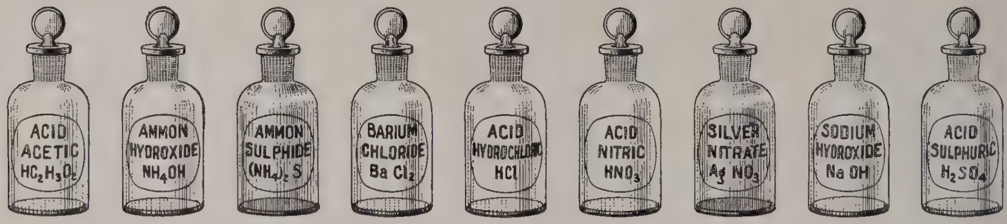
3-090. BOTTLE, Oil Sample, Polished Bottom. Made of clear flint glass, capacity 4 ounces, carefully washed dried and supplied with a good cork already in position. This is the standard bottle used for comparing the color of different samples, by viewing them through the bottom which has been ground true and polished. Packed, 3 gross to the case. **Per dozen, $2.25**
Case lot (3 gross), 20% discount.

3-095. BOTTLE MAILING CASE, for 4-Ounce Oil Sample Bottles. Sometimes called "proof cases." Made of heavy pasteboard, with metal screw cap; inside diameter 1¾ inches, inside height 7 inches. Made expressly as a mailing container for No. 3-090 and No. 3-085, 4-ounce Oil Sample Bottles. **Per dozen, $1.75**
Per gross, 15% discount.

3-100. BOTTLE, Pressure, Patent Stopper. Made of very heavy glass with rounded bottom. Designed to withstand considerable pressure, and are much heavier than the ordinary bottles. The stopper is permanently attached and clamps down tightly on the rubber washer. Capacity, 200 ml. **Each, $ .60**
Per dozen, 15% discount.

**Sizes adopted by the American Chemical Society, Standardization Committee.*

REAGENT BOTTLE SETS



Set 3-105 Set 3-110 Set 3-115

3-105. REAGENT BOTTLE SET, 40 Bottles, Narrow Mouth (4-Oz.), with raised, ground glass letters. This set has been selected to cover the needs of the chemist using the regular run of reagents ordinarily employed in the average American laboratory. Breakage replacements or additions, can be quickly made from the List of Regular Names appearing under No. 3-120, which bottles correspond in style and lettering to this set. For convenience, when making replacements, the number following the Chemical Symbol may be used, instead of writing out the full name of the bottle. See No. 3-120 for full description of the quality of these Reagent Bottles.

Acetic Acid	$HC_2H_3O_2$	3
Alcohol	C_2H_5OH	30
Ammonium Carbonate	$(NH_4)_2CO_3$	18
Ammonium Chloride	NH_4Cl	17
Ammonium Hydroxide	NH_4OH	15
Ammonium Oxalate	$(NH_4)_2C_2O_4$	19
Ammonium Sulphide (Amber)	$(NH_4)_2S$	16
Ammonium Sulphocyanide	NH_4CNS	31
Barium Carbonate	$BaCO_3$	33
Barium Chloride	$BaCl_2$	20
Barium Hydroxide	$Ba(OH)_2$	32
Calcium Chloride	$CaCl_2$	21
Calcium Hydroxide	$Ca(OH)_2$	23
Calcium Sulphate	$CaSO_4$	22
Cupric Sulphate	$CuSO_4$	36
Ether	$(C_2H_5)_2O$	35
Ferric Chloride	Fe_2Cl_6	29
Ferrous Sulphate	$FeSO_4$	28
Hydrochloric Acid	HCl	2
Hydrogen Sulphide (Amber)	H_2S	1
Lead Acetate	$Pb(C_2H_3O_2)_2$	27
Magnesium Sulphate	$MgSO_4$	24
Mercuric Chloride	$HgCl_2$	25
Nitric Acid	HNO_3	5
Potassium Carbonate	K_2CO_3	8
Potassium Dichromate	$K_2Cr_2O_7$	13
Potassium Ferricyanide	$K_3Fe(CN)_6$	11
Potassium Ferrocyanide	$K_4Fe(CN)_6$	6
Potassium Hydroxide	KOH	12
Potassium Iodide	KI	10
Potassium Sulphate	K_2SO_4	9
Potassium Sulphocyanide	KCNS	7
Silver Nitrate (Amber)	$AgNO_3$	26
Sodium Carbonate	Na_2CO_3	59
Sodium Hydroxide	NaOH	61
Sodium Phosphate	Na_2HPO_4	14
Sulphuric Acid	H_2SO_4	4
Blank (3 Bottles)		38

Per set of 40 Bottles, $16.00

3-110. REAGENT BOTTLE SET, 24 Bottles, Narrow Mouth (4-Oz.), with raised, ground glass letters. This set, according to Fresenius, consists of the following bottles selected from the List of Regular Names appearing under No. 3-120, to which, this set corresponds in style and lettering, and from which, breakage replacements or additions can be made. For convenience, when making replacements, the number following the Chemical Symbol may be used, instead of writing out the full name of the bottle. See No. 3-120 for full description of the quality of these Reagent Bottles.

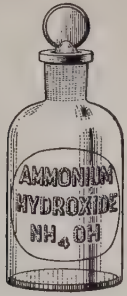
Acetic Acid	$HC_2H_3O_2$	3
Ammonium Carbonate	$(NH_4)_2CO_3$	18
Ammonium Chloride	NH_4Cl	17
Ammonium Hydroxide	NH_4OH	15
Ammonium Oxalate	$(NH_4)_2C_2O_4$	19
Ammonium Sulphide (Amber)	$(NH_4)_2S$	16
Barium Chloride	$BaCl_2$	20
Barium Hydroxide	$Ba(OH)_2$	32
Calcium Hydroxide	$Ca(OH)_2$	23
Calcium Sulphate	$CaSO_4$	22
Cupric Sulphate	$CuSO_4$	36
Ferric Chloride	Fe_2Cl_6	29
Hydrochloric Acid	HCl	2
Lead Acetate	$Pb(C_2H_3O_2)_2$	27
Mercuric Chloride	$HgCl_2$	25
Nitric Acid	HNO_3	5
Potassium Dichromate	$K_2Cr_2O_7$	13
Potassium Ferrocyanide	$K_4Fe(CN)_6$	6
Potassium Sulphocyanide	KCNS	7
Silver Nitrate (Amber)	$AgNO_3$	26
Sodium Carbonate	Na_2CO_3	59
Sodium Hydroxide	NaOH	61
Sodium Phosphate	Na_2HPO_4	14
Sulphuric Acid	H_2SO_4	4

Per set of 24 Bottles, $9.60

3-115. REAGENT BOTTLE SET, 12 Bottles, Narrow Mouth (4-Oz.), with raised, ground glass letters. This set has been selected to include the most used bottles from the List of Regular Names appearing under No. 3-120, to which, this set corresponds in style and lettering, and from which, breakage replacements and additions can be made. For convenience, when making replacements, the numbers following the Chemical Symbol may be used, instead of writing out the full name of the bottle. See No. 3-120 for full description of the quality of these Reagent Bottles.

Acetic Acid	$HC_2H_3O_2$	3
Ammonium Hydroxide	NH_4OH	15
Ammonium Sulphide (Amber)	$(NH_4)_2S$	16
Barium Chloride	$BaCl_2$	20
Calcium Hydroxide	$Ca(OH)_2$	23
Hydrochloric Acid	HCl	2
Hydrogen Sulphide (Amber)	H_2S	1
Lead Acetate	$Pb(C_2H_3O_2)_2$	27
Nitric Acid	HNO_3	5
Silver Nitrate (Amber)	$AgNO_3$	26
Sodium Hydroxide	NaOH	61
Sulphuric Acid	H_2SO_4	4

Per set of 12 Bottles, $4.80



3-120

REAGENT BOTTLES

Ground Glass Labels

3-125

3-120. BOTTLES, Reagent, Narrow Mouth (4-Oz.), Ground Glass Labels, Regular Names. Our Reagent Bottles are made from "Reagent Glass"; a special glass made just for this purpose. They are much harder, more brilliant than the ordinary bottles, and will show no free alkali. The bottles are made in convenient proportions with thin dropping lips and the glass stoppers well ground to fit each individual bottle.

The Chemical Names and Symbols are blown in the glass, and have the surface of the letters ground to make them more legible. The labels are therefore permanent, not being affected when the bottles are washed. These Reagent Bottles present a good appearance, and have been found so practical that this style has been adopted as standard in many laboratories throughout the country. **Regular Names** are those listed below. These can be supplied with the raised ground glass labels, as described. For convenience, the number following the Chemical Symbol may be used, instead of the full name of the bottle, when writing an order.

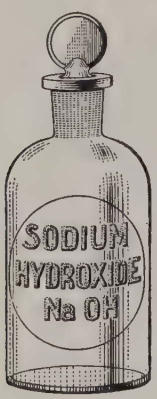
Special Names, meaning all others not listed under Regular Names, must be made by engraving the inscription upon Blank Bottles, No. 38. The appearance of the engraved lettering, depressed in the glass, will be somewhat different than that of the raised ground glass labels, which are blown-in-the-mold. However, these engraved labels look well with the Regular Names, supplied under Catalogue No. 3-120. See No. 3-125 (*described on page 90*), when ordering Special Names.

REGULAR NAMES

When ordering 4-oz. narrow mouth bottles other than those listed under No. 3-120, use catalogue No. 3-125.

Acetic Acid	$HC_2H_3O_2$	3
Alcohol	C_2H_5OH	30
Ammonium Acetate	$NH_4C_2H_3O_2$	439
Ammonium Carbonate	$(NH_4)_2CO_3$	18
Ammonium Chloride	NH_4Cl	17
Ammonium Hydroxide	NH_4OH	15
Ammonium Hydroxide, Con	NH_4OH	440
Ammonium Hydroxide, Dil	NH_4OH	441
Ammonium Molybdate	$(NH_4)_6Mo_7O_{24}$	82
Ammonium Oxalate	$(NH_4)_2C_2O_4$	19
Am. Sulphide (Amber)	$(NH_4)_2S$	16
Am. Sulphocyanide	NH_4CNS	31
Am. Sulphydrate	NH_4HS	97
Barium Carbonate	$BaCO_3$	33
Barium Chloride	$BaCl_2$	20
Barium Hydroxide	$Ba(OH)_2$	32
Barium Nitrate	$Ba(NO_3)_2$	401
Benedict Solution		437
Biuret Reagent		436
Bromine for Hypo-Bromite		426
Bromine Water		406
Calcium Chloride	$CaCl_2$	21
Calcium Hydroxide	$Ca(OH)_2$	23
Calcium Sulphate	$CaSO_4$	22
Carbon Disulphide	CS_2	83
Carbon Tetrachloride	CCl_4	433
Chloroform	$CHCl_3$	407
Cochineal		408
Coralline		409
Cupric Sulphate	$CuSO_4$	36
Dimethyl Glyoxime	$(CH_3)_2C_2(NOH)_2$	421
Esbach's Reagent		646
Ether	$(C_2H_5)_2O$	35
Fehling's Solution		58
Ferric Chloride	Fe_2Cl_6	29
Ferrous Sulphate	$FeSO_4$	28
Hydrochloric Acid	HCl	2
Hydrochloric Acid, Con	HCl	419
Hydrochloric Acid, Dil	HCl	429
Hydrogen Peroxide		428
Hydrogen Sul. (Amber)	H_2S	1
Indigo Solution		87
Iodine Solution	$I+KI$	414
Lead Acetate	$Pb(C_2H_3O_2)_2$	27
Litmus		410
Magnesia Mixture		90
Magnesium Chloride	$MgCl_2$	438
Magnesium Sulphate	$MgSO_4$	24
Mercuric Chloride	$HgCl_2$	25
Mercuric Potass. Iodide		100
Mercurous Nitrate	$Hg_2(NO_3)_2$	86
Methyl Alcohol	CH_3OH	415
Methyl—Orange		411
Millon's Reagent		435
Nessler's Solution		88
Nitric Acid	HNO_3	5
Nitric Acid, Con	HNO_3	422
Nitric Acid, Dil	HNO_3	430
Obermayer's Reagent		425
Oxalic Acid	$H_2C_2O_4$	93
Phenol	C_6H_5OH	423
Phenolphthalein		412
Picric Acid	$C_6H_2OH(NO_2)_3$	94
Platinic Chloride	$PtCl_4$	37
Potassium Carbonate	K_2CO_3	8
Potassium Chromate	K_2CrO_4	96
Potassium Cyanide	KCN	432
Potassium Dichromate	$K_2Cr_2O_7$	13
Potassium Ferricyanide	$K_3Fe(CN)_6$	11
Potassium Ferrocyanide	$K_4Fe(CN)_6$	6
Potassium Hydroxide	KOH	12
Potassium Iodide	KI	10
Potassium Sulphate	K_2SO_4	9
Potass. Sulphocyanide	$KCNS$	7
Silver Nitrate (Amber)	$AgNO_3$	26
Silver Sulphate	Ag_2SO_4	404
Sodium Acetate	$NaC_2H_3O_2$	60
Sodium Carbonate	Na_2CO_3	59
Sodium Cobaltic Nitrite		416
Sodium Hydroxide	$NaOH$	61
Sod. Hydrox. for Hypo-Bromite		427
Sodium Phosphate	Na_2HPO_4	14
Sodium Thiosulphate	$Na_2S_2O_3$	417
Stannous Chloride	$SnCl_2$	81
Sulphuric Acid	H_2SO_4	4
Sulphuric Acid, Con	H_2SO_4	420
Sulphuric Acid, Dil	H_2SO_4	431
Tinct. Guaiac		424
Tumeric		413
Uranium Acetate	$UO_2(C_2H_3O_2)_2$	56
Blank		38

Each, $ .45 **Per dozen** (assorted) **$4.80** **Per Gross** (assorted) **$48.00**



3-130

REAGENT BOTTLES

Ground Glass Labels

3-135

3-125. BOTTLES, Reagent, Narrow Mouth (4-Oz.), Special Engraved Names. (*For illustration see page 89.*) This catalogue number should be specified for 4-oz. Reagent Bottles with any name or inscription not listed under No. 3-120. We will furnish Reagent Bottles of similar dimensions to No. 3-120 (*Blank, No. 38*), but special attention is called to the fact that the **raised, ground glass labels will not be supplied.** The labels will be engraved in the glass (*depressed*), and not raised like when blown-in-the-mold. These engraved labels are permanent and very legible; and look well with No. 3-120 bottles. *Two weeks are usually required to fill orders for Special Names.* **Each, $ 1.40**
Per dozen (assorted) **$13.40**

3-130. BOTTLES, Reagent, Narrow Mouth (**8-Oz.**), **Ground Glass Labels, Regular Names.** These Reagent Bottles are similar to, and line up with, No. 3-120 Bottles, but are available only with the following labels with raised, ground glass letters. For convenience, the number following the Chemical Symbol may be used, instead of the full name of the bottle, when writing an order. For Special Names, see No. 3-135.

Our Reagent Bottles are made of "Reagent Glass," a special glass for this purpose. They are much harder, more brilliant than the ordinary bottles and show no free alkali. The glass stoppers are well ground to fit each individual bottle.

The Chemical Names and Symbols are blown in the glass and have the surface of the letters ground to make them more legible. The labels, therefore, are permanent, not being affected when the bottles are washed.

REGULAR NAMES

When ordering 8-oz. narrow mouth bottles other than those listed under No. 3-130, use catalogue No. 3-135.

Acetic Acid	$HC_2H_3O_2$	131
Alcohol	C_2H_5OH	126
Ammonia	NH_3	157
Ammonium Carbonate	$(NH_4)_2CO_3$	110
Ammonium Chloride	NH_4Cl	109
Ammonium Hydroxide	NH_4OH	108
Ammonium Molybdate	$(NH_4)_6Mo_7O_{24}$	155
Ammonium Oxalate	$(NH_4)_2C_2O_4$	130
Ammonium Phosphate	$(NH_4)_2HPO_4$	158
Am. Sulphide (Amber)	$(NH_4)_2S$	122
Barium Acetate	$(C_2H_3O_2)_2$	163
Barium Chloride	$BaCl_2$	114
Calcium Hydroxide	$Ca(OH)_2$	151
Ether	$(C_2H_5)_2O$	159
Ferrous Sulphate	$FeSO_4$	154
Hydrochloric Acid	HCl	162
Hydrochloric Acid, Con	HCl	105
Hydrochloric Acid, Dil	HCl	106
Hydrogen Sul. (Amber)	H_2S	107
Lead Acetate	$Pb(C_2H_3O_2)_2$	152
Mercuric Chloride	$HgCl_2$	153
Nitric Acid	HNO_3	174
Nitric Acid, Con	HNO_3	103
Nitric Acid, Dil	HNO_3	104
Potassium Carbonate	K_2CO_3	171
Potassium Chromate	K_2CrO_4	160
Potassium Ferricyanide	$K_3Fe(CN)_6$	172
Potassium Ferrocyanide	$K_4Fe(CN)_6$	173
Potassium Hydroxide	KOH	150
Silver Nitrate (Amber)	$AgNO_3$	145
Sodium Carbonate	Na_2CO_3	112
Sodium Hydroxide	$NaOH$	111
Sodium Phosphate	Na_2HPO	129
Stannous Chloride	$SnCl_2$	156
Sulphuric Acid	H_2SO_4	175
Sulphuric Acid, Con	H_2SO_4	101
Sulphuric Acid, Dil	H_2SO_4	102
Blank		116

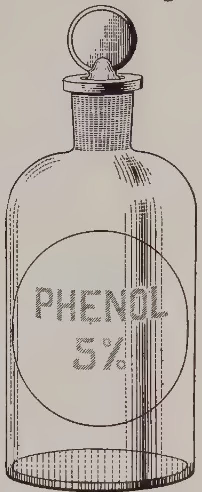
Each, $ .60 **Per dozen** (assorted) **$6.10** **Per gross** (assorted) **$61.00**

3-135. BOTTLES, Reagent, Narrow Mouth (**8-Oz.**), **Special Engraved Names.** This catalogue number should be specified for 8-oz. Reagent Bottles with any name or inscription not listed under No. 3-130. We will furnish Reagent Bottles of similar dimensions to No. 3-130 (*Blank, No. 116*), but special attention is called to the fact that the **raised ground glass labels will not be supplied.** The labels will be engraved in the glass (*depressed*), and not raised like when blown-in-the-mold. The engraved labels are permanent and very legible; and look well with No. 3-130 Bottles. *Two weeks are usually required to fill orders for Special Names.* **Each, $ 1.55**
Per dozen (assorted) **$15.40**

3-140

3-145

3-150



3-155

3-140. BOTTLES, Reagent, Narrow Mouth (16-Oz.), Ground Glass Labels, Regular Names. These Reagent Bottles are similar to, and line up with, Nos. 3-120 and 3-130, but are available only with the following labels with raised, ground glass letters. For convenience, the number following the Chemical Symbol may be used, instead of the full name of the bottle, when writing an order. For Special Names, see No. 3-145.

REGULAR NAMES

When ordering 16-oz. narrow mouth bottles other than those listed under No. 3-140, use catalogue No. 3-145.

Acetic Acid	$HC_2H_3O_2$	237
Alcohol	C_2H_5OH	259
Ammonium Acetate	CH_3COONH_4	241
Ammonium Carbonate	$(NH_4)_2CO_3$	235
Ammonium Chloride	NH_4Cl	234
Ammonium Hydroxide	NH_4OH	204
Am. Hydroxide, Dil	NH_4OH+Aq	227
Ammonium Oxalate	$(NH_4)_2C_2O_4$	258
Ammonium Sulph. (Amber)	$(NH_4)_2S$	236
Am. Sulphide, Dil	$(NH_4)_2S+Aq$	229
Barium Chloride	$BaCl_2$	218
Calcium Hydroxide	$Ca(OH)_2$	223
Calcium Sulphate	$CaSO_4$	225
Ether	$(C_2H_5)_2O$	230
Ferrous Sulphate	$FeSO_4$	224
Hydrochloric Acid	HCl	217
Hydrochloric Acid, Con	HCl	222
Hydrochloric Acid, Dil	HCl	231
Hydrodisodic Phosphate	Na_2HPO_4	226
Nitric Acid	HNO_3	216
Nitric Acid, Con	HNO_3	219
Nitric Acid, Dil	HNO_3	232
Potassium Chromate	K_2CrO_4	238
Potassium Dichromate	$K_2Cr_2O_7$	239
Potassium Hydroxide	KOH	221
Silver Nitrate (Amber)	$AgNO_3$	245
Sodium Carbonate	Na_2CO_3	240
Sodium Hydroxide	$NaOH$	233
Sodium Hydroxide Dil	$NaOHAq$	228
Sulphuric Acid	H_2SO_4	215
Sulphuric Acid, Con	H_2SO_4	220
Sulphuric Acid, Dil	H_2SO_4	242
Blank		211

Each, $ .80 **Per dozen** (assorted) **$8.10** **Per gross** (assorted) **$81.00**

3-145. BOTTLES, Reagent, Narrow Mouth (16-Oz.), Special Engraved Names. This catalogue number should be specified with any name or inscription not listed under No. 3-140. We will furnish Reagent Bottles of similar dimensions to No. 3-140 (*Blank, No. 211*), but special attention is called to the fact that the **raised, ground glass letters will not be supplied.** The labels will be engraved in the glass (*depressed*), and not raised like when blown-in-the-mold. The engraved labels are permanent and very legible; and look well with No. 3-140 Bottles. **Each, $1.90** **Per dozen** (assorted) **$19.50**

3-150. BOTTLES, Reagent, Narrow Mouth (32-Oz.), Ground Glass Labels, Regular Names. These Reagent Bottles are similar to, and line up with, Nos. 3-120, 3-130 and 3-140, but are available only with the following labels with raised, ground glass letters. For convenience, the number following the Chemical Symbol may be used, instead of the full name of the bottle, when writing an order. For Special Names, see No. 3-155.

REGULAR NAMES

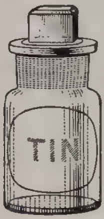
When ordering 32-oz. narrow mouth bottles other than those listed under No. 3-150, use catalogue No. 3-155.

Ammonium Hydroxide	NH_4OH	512
Hydrochloric Acid, Con	HCl	505
Hydrochloric Acid, Dil	HCl	506
Nitric Acid, Con	HNO_3	503
Nitric Acid, Dil	HNO_3	504
Sulphuric Acid, Con	H_2SO_4	501
Sulphuric Acid, Dil	H_2SO_4	502
Blank		511

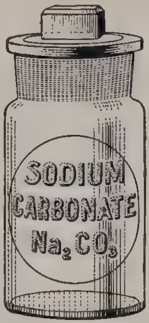
Each, $1.25 **Per dozen** (assorted) **$12.60**

3-155. BOTTLES, Reagent, Narrow Mouth (32-Oz.), Special Engraved Names. This catalogue number should be specified with any name or inscription not listed under No. 3-150. We will furnish Reagent Bottles of similar dimensions to No. 3-150 (*Blank, No. 511*), but special attention is called to the fact that the **raised, ground glass letters will not be supplied.** The labels will be engraved in the glass (*depressed*), and not raised like when blown-in-the-mold. The engraved labels are permanent and very legible; and look well with No. 3-150 Bottles. **Each, $2.50** **Per dozen** (assorted) **$26.00**

3-160



3-165



3-170

3-175

3-160. BOTTLES, Reagent, Wide Mouth (1-Oz.), Ground Glass Labels, Regular Names. This one-ounce (1-oz.) Reagent Bottle has been found convenient for Metallurgists and others who desire to carry small quantities of reagents in portable cases, but we call your attention to the fact that labels with raised, ground glass letters blown-in-the-mold, are available only with the following names. For convenience, the number following the Chemical Symbol may be used instead of the full name of the bottle, when writing an order. For Special Names, see No. 3-165.

REGULAR NAMES

When ordering 1-oz. wide mouth bottles other than those listed under No. 3-160, use catalogue No. 3-165.

Ammonium Phosphate	$(NH_4)_2HPO_4$	374	Potassium Nitrate	KNO_3	354
Am. Sod. Phosphate	$NaNH_4HPO_4$	361	Test Paper		372
Borax	$Na_2B_4O_7$	351	Sodium Acetate	$NaC_2H_3O_2$	353
Copper	Cu	364	Sodium Bitartrate	$NaHC_4H_4O_6$	369
Ferrous Sulphate	$FeSO_4$	365	Sodium Carbonate	Na_2CO_3	350
Ferrous Sulphide	FeS	366	Sodium Nitrate	$NaNO_3$	370
Phenyl Hydrazine	$C_6H_5NHNH_2$	377	Sod. Pot. Carbonate	Na_2CO_3, K_2CO_3	376
Potassium Chlorate	$KClO_3$	367	Starch		371
Potassium Cyanide	KCN	358	Zinc		373
Potassium Ferricyanide	$K_3Fe(CN)_6$	368	Blank		375

Each, $ .40 **Per Dozen** (assorted) **$4.00**

3-165. BOTTLES, Reagent, Wide Mouth (1-Oz.), Special Engraved Names. This catalogue number should be specified with any name or inscription not listed under No. 3-160. We will furnish Reagent Bottles of similar dimensions as No. 3-160 (*Blank, No. 375*), but special attention is called to the fact that the **raised, ground glass letters will not be supplied.** The labels will be engraved in the glass (*depressed*), and not raised like when blown-in-the-mold. The engraved labels are permanent and very legible; and look well with No. 3-160 Bottles.

Each, $1.30 **Per dozen** (assorted) **$13.00**

3-170. BOTTLES, Reagent, Wide Mouth (4-Oz.), Ground Glass Labels, Regular Names. These Reagent Bottles have extra wide mouths, otherwise they are similar to, and line up with, Nos. 3-120, 3-130, 3-140, and 3-150, but are available only with the following labels with raised, ground glass letters. For convenience, the number following the Chemical Symbol may be used instead of the full name of the bottle, when writing an order. For Special Names, see No. 3-175.

Our Reagent Bottles are made of "Reagent Glass," a special glass for this purpose. They are much harder, more brilliant than ordinary bottles and show no free alkali. The glass stoppers are extra wide and well ground to fit each individual bottle. These wide-mouthed bottles, for dry salts, line up with No. 3-120 narrow-mouthed bottles, for liquids.

REGULAR NAMES

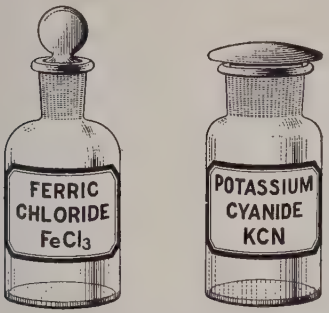
When ordering 4-oz. wide mouth bottles other than those listed under No. 3-170, use catalogue No. 3-175.

Ammonium Sulphate	$(NH_4)_2SO_4$	314	Sod. Am. Hyd. Phos.	$Na(NH_4)HPO_4+4H_2O$	313
Borax	$Na_2B_4O_7$	304	Sodium Carbonate	Na_2CO_3	301
Ferrous Sulphate	$FeSO_4$	305	Test Paper		312
Potassium Cyanide	KCN	303	Blank		307
Potassium Nitrate	KNO_3	302			

Each, $ .55 **Per dozen** (assorted) **$5.50** **Per gross** (assorted) **$50.00**

3-175. BOTTLES, Reagent (4-Oz.), Wide Mouth, Special Engraved Names. This catalogue number should be specified with any name or inscription not listed under No. 3-170. We will furnish Reagent Bottles of similar dimensions to No. 3-170, but special attention is called to the fact that the **raised, ground glass letters will not be supplied.** The labels will be engraved in the glass (*depressed*), and not raised like when blown-in-the-mold. The engraved labels are permanent and very legible; and look well with No. 3-170 Bottles.

Each, $1.45 **Per dozen** (assorted) **$14.00**



Set No. 3-190

3-195 3-200

3-205

3-190. BOTTLES, Reagent Set, Black and White Shield, made of potash glass, which has a brilliant finish. The bottles are the low, wide shape with flat bottoms, so that the bottles rest squarely on the shelf. These bottles give a pleasing appearance to the laboratory.

The shield is white with black letters and black border. The shield is permanent and makes a contrasting background for the black letters. The surface of the labels can be written upon.

The glass stoppers are carefully ground to fit each individual bottle and, for convenience, the stoppers for the narrow mouth bottles have coin-shaped heads, and those for the wide mouth bottles have flat overlapping heads.

These Reagent Bottles are supplied in complete sets of forty (40) bottles, with the names and the sizes listed below: (*For extra bottles, with Blank Shields, see No. 3-195, No. 3-200 and No. 3-205.*)

SET OF 40 BLACK LETTERED, REAGENT BOTTLES

(5) Narrow Mouth—250 ml.

Acid Hydrochloric	HCl
Acid Nitric	HNO_3
Acid Sulphuric (Dil.)	H_2SO_4
Ammon. Hydroxide	$(NH_4)OH$
Blank	

(28) Narrow Mouth—125 ml.

Acid Acetic	$HC_2H_3O_2$
Acid Sulphuric (Conc.)	H_2SO_4
Alcohol 95%	C_2H_5OH
Ammon. Carbonate	$(NH_4)_2CO_3$
Ammon. Chloride	$(NH_4)Cl$
Ammon. Molybdate	$(NH_4)_2MoO_4$
Ammon. Oxalate	$(NH_4)_2C_2O_4$
Ammon. Sulphide (*amber glass*)	$(NH_4)_2S$
Ammon. Sulphocyanate	$(NH_4)CNS$
Barium Chloride	$BaCl_2$
Calcium Hydroxide	$Ca(OH)_2$
Cupric Sulphate	$CuSO_4$
Ether	$(C_2H_5)_2O$
Ferric Chloride	Fe_2Cl_6
Hydrogen Sulphide (*amber glass*)	H_2S
Lead Acetate	$Pb(C_2H_3O_2)_2$
Magnesium Sulphate	$MgSO_4$

Narrow Mouth—125 ml. (Continued)

Mercuric Chloride	$HgCl_2$
Mercurous Nitrate	$Hg_2(NO_3)_2$
Potassium Dichromate	$K_2Cr_2O_7$
Potassium Ferrocyanide	$K_4Fe(CN)_6$
Potassium Iodide	KI
Silver Nitrate (*amber glass*)	$AgNO_3$
Sodium Acetate	$NaC_2H_3O_2$
Sodium Carbonate	Na_2CO_3
Sodium Phosphate	Na_2HPO_4
Uranium Acetate	$(UO_2)\ (C_2H_3O_2)_2$
Blank	

(1) Narrow Mouth—30 ml.

Platinic Chloride	$PtCl_4$

(6) Wide Mouth—125 ml.

Ammon. Sod. Phosphate	$NaNH_4HPO_4$
Borax	$Na_2B_4O_7$
Ferrous Sulphate	$FeSO_4$
Potassium Cyanide	KCN
Sodium Carbonate	Na_2CO_3
Test Paper	

Per set of 40 Bottles, $37.00

3-195. BOTTLES, Reagent, Black and White Shield, Blank, Clear Glass, Narrow Mouth. Similar in size, shape, and design to the narrow mouth reagent bottles in Set No. 3-190. These bottles are supplied with blank shields only. The shields can be written upon.

Capacity, ml.	30	125	250
Each	**$ .65**	**.80**	**.95**

Per dozen, 10% discount.

3-200. BOTTLES, Reagent, Black and White Shield, Blank, Amber Glass, Narrow Mouth. These bottles are for use with solutions, which are affected by the light. They are similar in size, shape, and design to the narrow mouth reagent bottles in Set No. 3-190, and are supplied with blank shields only. The shields can be written upon.

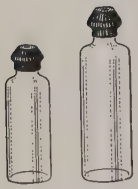
Capacity, ml.	125	250
Each	**$ .95**	**1.05**

Per dozen, 10% discount.

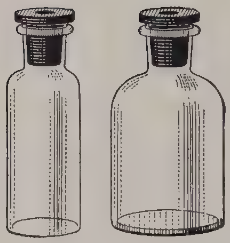
3-205. BOTTLES, Reagent, Black and White Shield, Blank, Clear Glass, Wide Mouth. Similar in size, shape, and design to the wide mouth reagent bottles in Set No. 3-190. These bottles are supplied with blank shields only. The shields can be written upon.

Capacity, ml.	125	250
Each	**$ .85**	**1.00**

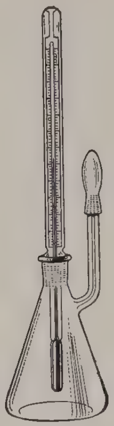
Per dozen, 10% discount.



3-210
See also No. 3-215



3-220
See also No. 3-225



3-230

3-235

3-240

3-210. BOTTLES, Serum or Vaccine, of Resistance Glass, with Rubber Cap Stoppers, which fit down over the neck of the bottle and are perforated to within 1 mm. of the top for the insertion of the hypodermic needle. This permits the withdrawal of the contents without removing the stopper.

Capacity, approx. ml	5	10
Per dozen	**$ .65**	**.75**

Per gross, 15% discount.

3-215. BOTTLE "Rubber Cap" STOPPERS, for Serum Bottles No. 3-210. The same size of stopper fits both sizes of bottles.
Per dozen, $ .15
Per gross, $1.50

3-220. BOTTLES, Serum or Vaccine, of Resistance Glass with low alkali content, specially manufactured as containers for sera, vaccines and other liquids which are contaminated by the ordinary lime or flint glass bottle. The 10 and 15 ml sizes are made from glass tubing, and the 30 and 60 ml. sizes are blown in a mold. The soft, red rubber stopper is perforated to within 1 mm. of the top, which enables the insertion of a hypodermic needle without removing the stopper and avoids contamination because the rubber hermetically seals the bottle again upon withdrawal of the needle. Furnished complete with special rubber stoppers.

Capacity, ml	10	15	30	60
Per dozen	**$1.50**	**1.80**	**2.75**	**3.15**

Per gross, 20% discount.

3-225. BOTTLE STOPPERS, Red Rubber, perforated to within about 1 mm. of the top, for No. 3-220 Serum Bottles. The same stopper fits all sizes of bottles.
Per dozen, $ .45
Per gross, $4.25

3-230. BOTTLES, Specific Gravity, with Thermometer. New conical shape, with wide, flat bottoms to prevent toppling over; made of light lamp-blown glass, with overflow tube and ground-in glass cap. The thermometer has a milk glass scale graduated from 10° to 40° C. in 1/5 degree divisions, and is sealed in the glass stopper which is ground to fit the neck of the bottle. These Specific Gravity Bottles are accurately adjusted.

*Capacity, ml	25	50	100
Height over all, approx. mm	180	190	200
Each	**$3.00**	**3.50**	**4.00**

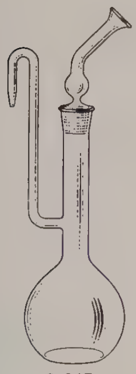
3-235. BOTTLES, Specific Gravity, Gay-Lussac, Unadjusted, for calibration in the laboratory. Made of light lamp-blown glass with ground-in perforated glass stoppers.

*Capacity, ml	10	25	50
Height over all, approx. mm	70	80	100
Each	**$ .50**	**.60**	**.70**

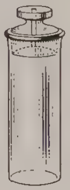
3-240. BOTTLES, Specific Gravity, Gay-Lussac, Accurately Adjusted. Made of light lamp-blown glass, with ground-in perforated glass stoppers.

*Capacity, ml	10	25	50	100
Height over all, approx. mm	70	80	100	110
Each	**$ .80**	**1.00**	**1.25**	**1.60**

**Sizes adopted by the American Chemical Society, Standardization Committee*



3-245



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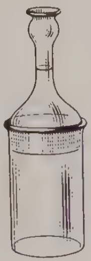

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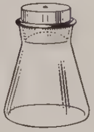


3-260

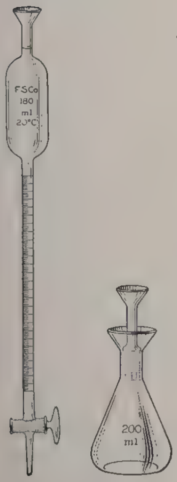
3-245. BOTTLE, Specific Gravity, Hogarth. For determining the specific gravity of Iron Ores and similar materials; diameter of bulb approximately 50 mm., height over all 175 mm.; for calibration in the laboratory.
Each, $2.25

3-250. BOTTLE, Specific Gravity, A. S. T. M. Type, Hubbard form; for determining the specific gravity of Road Oils, Road Tars, Asphalt Cements, Soft Tar Pitches, and other materials of similar consistency.

Bottle is made of glass with ground-in stopper having a 1.6 mm. hole; capacity about 24 ml., height about 70 mm., diameter about 22 mm. Recommended in A. S. T. M. Standards, 1924, No. D 70-20-T.
Each, $1.65

3-255. BOTTLE, Specific Gravity, Barrett Type, 50 ml. capacity; for the determination of specific gravity of Tar and Pitch and similar materials. Bottle is made of glass, with top ground to fit; calibrated and marked at 50 ml. For method, see *Jour. Ind. Eng. Chem. X-732 (Sept., 1918).* **Each, $1.75**

3-260. BOTTLE, Specific Gravity, Hubbard-Carmick, Erlenmeyer form. A modified Hubbard type, for use with viscous fluids, semi-solid bitumens and emulsions. The bottle is made of lamp-blown glass and is about 45 mm. high, 40 mm. diameter at bottom and 25 mm. diameter at the mouth. The stopper is made of solid glass, carefully ground to fit the neck, and a 1 mm. hole in the center permits the stopper to be easily inserted when the flask is filled with a viscous oil. The lower surface of the stopper is made cup-shaped to allow air bubbles to escape through the bore. The bottle has a capacity of about 25 ml. and weighs about 25 grams. For method, see *U. S. Department of Agriculture, Bulletin No. 949, October 10, 1921, page 36, Test No. 19.* **Each, $1.65**

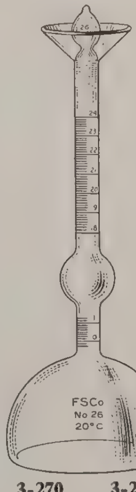


3-265

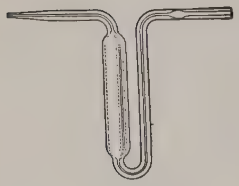
3-265. BOTTLE, Specific Gravity, Jackson Apparatus, for determining the specific gravity of Sand, Stone, and Slag Screenings in Cement Analysis. Consisting of an Erlenmeyer flask with ground-in glass stopper, accurately graduated at 200 ml., and a burette with glass stopcock, calibrated so that the Specific Gravity can be read directly to 0.01 Sp. Gr. For method, see A. S. T. M. *Standard Specifications for 1924,* Serial No. D 55-24, "Methods of Test for Apparent Specific Gravity of Sand, Stone, and Slag Screenings, and other fine Non-Bituminous Highway Materials." **Each, $8.00**

3-270. BOTTLE, Specific Gravity, Le Chatelier—A. S. T. M. Made of glass, carefully calibrated in accordance with the specifications given in Circular No. 9 of the U. S. Bureau of Standards and adopted by the American Society for Testing Materials for determining the Specific Gravity of Cement, Sand, Stone, Slag Screenings and other fine Non-Bituminous Highway Materials. Diameter of bulb 90 mm., height 243 mm. For methods, see A. S. T. M. *Standard Specifications for 1924,* Serial Nos. C 9-21 and D 55-24.
Each, $5.50

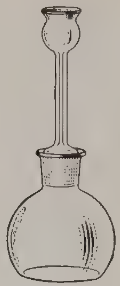
3-275. BOTTLE, Specific Gravity, Le Chatelier—A. S. T. M. Same as No. 3-270 but **Standardized by the United States Bureau of Standards** and supplied with their certificate.
Each, $9.00



3-270 3-275



3-280



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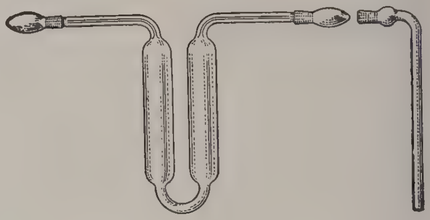
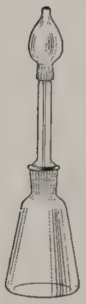


3-290

3-280. BOTTLE, Specific Gravity, Nichol Tube, for liquids. Made of lamp-blown glass, capacity about 5 ml., without mark; for calibration in the laboratory. **Each, $ .70**

3-285. BOTTLE, Specific Gravity, Regnault. Made of lamp-blown glass, with ground-in glass capillary tube; capacity about 25 ml., without mark; for calibration in the laboratory. This Specific Gravity bottle is used largely in Aluminum Laboratories. **Each, $1.25**

3-290. BOTTLE, Specific Gravity, Sprengel, for liquids. Made of lamp-blown glass, capacity about 10 ml. in each tube, without marks; for calibration in the laboratory. The extra glass tube, with one end ground to fit, is attached when the bottle is being filled. Two glass caps, ground to fit, seal the bottle when it is being weighed. **Each, $1.50**



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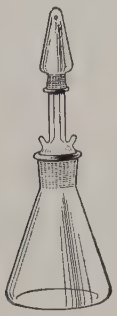
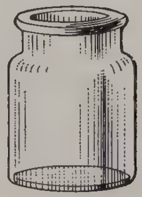
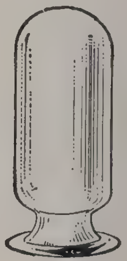


3-300



3-305



3-310

3-295. BOTTLE, Specific Gravity, Walker, for Liquids. Made of lamp-blown glass, with ground-in stopper and glass cap, capacity about 25 ml., for calibration in the laboratory; in accordance with Bulletin No. 109, U. S. Dept. of Agriculture, Bureau of Chemistry. **Each, $2.50**

3-300. BOTTLE, Specific Gravity, Walker, for Viscous Liquids. Made of lamp-blown glass, with ground-in stopper and glass cap, capacity about 50 ml., for calibration in the laboratory; in accordance with Bulletin No. 109, U. S. Dept. of Agriculture, Bureau of Chemistry. **Each, $2.90**

3-305. BOTTLES, Specimen, Histological, Extra Wide Mouths, for corks, of clear flint glass, with fine finish. Designed so that the proportions are particularly adapted for the exhibition and storing of Histological Specimens for section cutting and for other uses where a high quality bottle of a low, wide shape is desired. It is also used for purposes where a bottle with an extra wide mouth is required.

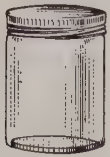
Size	A	B	C	D
Capacity, ml	30	50	100	150
Height, mm	50	60	70	85
Diameter of Neck, inside, mm	25	30	40	40
Per dozen	$1.20	1.25	1.75	2.00

Per gross, 20% discount.

3-310. BOTTLES, Specimen, Inverted Form, of clear flint glass, for cork stopper; for storing and showing samples of chemicals, cereals, minerals, materials in different stages of manufacture, etc.

Capacity, ounces	2	4	8	16	32
Height, inches	3¾	4½	6	7¾	9
Diameter, inches	1½	2	2½	2¾	3½
Each	$ .28	.32	.40	.55	.70

Per dozen, 15% discount.



3-315
See also No. 3-320

3-325

3-315. BOTTLES, Screw Cap, Round, of clear glass, with satin finished aluminum screw caps having waxed pasteboard liners, which prevent the contents from coming in contact with the metal and also act as washers for tight sealing. Used for specimens, for samples, or as laboratory containers; are very convenient for transporting.

Capacity, ounces	1	2	4	8	16	32
Per dozen	**$ .65**	**.75**	**1.10**	**1.40**	**2.40**	**3.00**

Per gross, 15% discount.

3-320. BOTTLE CAP LINERS, of Cork, to fit No. 3-315 Bottles.

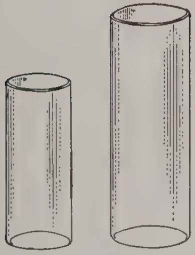
For Bottles, ounces	1	2	4	8	16	32
Per dozen	**$ .15**	**.18**	**.20**	**.25**	**.30**	**.40**

Per gross, 15% discount.

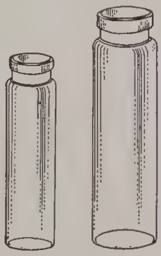
3-325. BOTTLES, Screw Cap, Square, of clear glass, with satin finished aluminum screw caps having cork liners, which prevent the contents from coming in contact with the metal and also act as washers for tight sealing. Used for specimens, for samples, or as laboratory containers; are very convenient for transporting.

Capacity, ounces	1	2	4	8
Per dozen	**$1.25**	**1.40**	**1.80**	**2.30**

Per gross, 15% discount.



3-330



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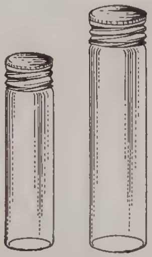


3-340

3-330. BOTTLES, Specimen Vials, of clear glass, straight sides, flat bottom, without neck; sometimes called "shell vials"; furnished without corks.

Height, mm	40	50	60	70	80	80
Diameter, mm	15	20	25	25	20	25
For Cork No	4	7	11	11	7	11
Per dozen	**$ .15**	**.30**	**.50**	**.50**	**.35**	**.55**

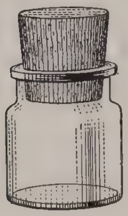
Per gross, 15% discount.

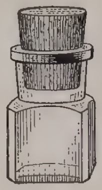
3-335. BOTTLES, Specimen Vials, "Homeopathic," of clear glass, with necks; furnished without corks.

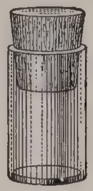
Capacity, drachms	1	2	4	6	8
Capacity, approx., ml	5	8	12	25	30
Height, over all, mm	45	60	70	80	90
Diameter, mm	14	16	20	22	24
Per dozen	**$ .20**	**.25**	**.40**	**.55**	**.65**
Per gross	**$1.70**	**2.10**	**3.75**	**5.00**	**6.25**

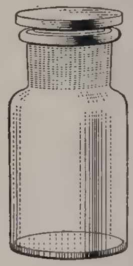
3-340. BOTTLES, Specimen Vials, Screw Cap, similar to No. 3-335 in size and shape, with metal screw caps of aluminum.

Capacity, drachms	1	2	4	6	8
Per dozen	**$ .35**	**.40**	**.50**	**.70**	**.80**
Per gross	**$3.00**	**3.60**	**5.00**	**7.00**	**8.00**


3-345
3-350


3-355
3-360


3-365
3-370


3-375
See also page 81

3-345. BOTTLE, Sputum, Round, extra wide mouth, of clear flint glass, for cork stopper; capacity 30 ml., height 50 mm., inside diameter of neck 25 mm., diameter of bottle 43 mm.; supplied without cork.
Per dozen, $1.20
Per gross, 20% discount.

3-350. BOTTLE CORK, XXX Quality, No. 13, to fit No. 3-345 Sputum Bottle..............**Per dozen, $ .20**
Per gross, $1.50

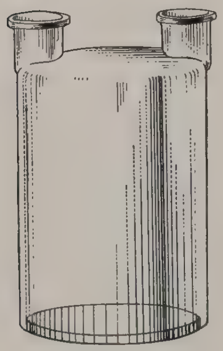
3-355. BOTTLE, Sputum, Square, wide mouth, of clear flint glass, for cork stopper; capacity 10 ml., height 50 mm., length of each side 30 mm.; supplied without cork.
Per dozen, $ .75
Per gross, 20% discount.

3-360. BOTTLE CORK, XXX Quality, No. 10, to fit No. 3-355 Sputum Bottle..............**Per dozen, $ .15**
Per gross, $1.20

3-365. BOTTLE, Sputum, Round, without neck, of heavy greenish glass, for cork stopper; inside diameter 23 mm., height 50 mm. Used largely by Boards of Health for the transportation of sputum and other samples; furnished without cork.
Per dozen, $ .85
Per gross, 20% discount.

3-370. BOTTLE CORK, XXX Quality, No. 11, to fit No. 3-365 Sputum Bottle..............**Per dozen, $ .15**
Per gross, $1.25

3-375. BOTTLE, Water Sample, wide mouth, with flat-head glass stopper ground to fit the neck of the bottle; capacity 60 ml. Used largely in Filtration and Health Laboratories. Original cases contain 150 bottles.
Each, $ .30
Original case lots, 25% discount.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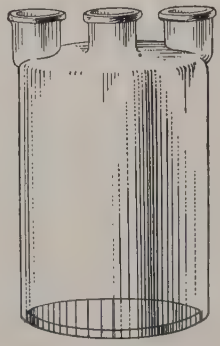
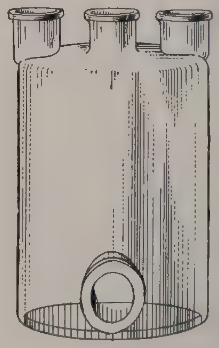

3-385


3-390

3-380. BOTTLES, Woulff, with Two Necks, of clear, heavy molded glass.

*Capacity, ml	250	500	1000
Each	**$1.25**	**1.60**	**2.00**

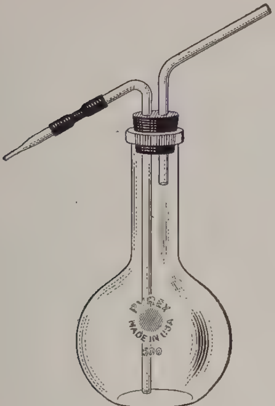
3-385. BOTTLES, Woulff, with Three Necks, of clear, heavy molded glass.

*Capacity, ml	250	500	1000
Each	**$1.50**	**1.80**	**2.25**

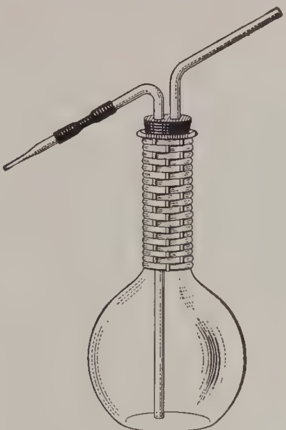
3-390. BOTTLES, Woulff, with Three Necks and Tubulature, of clear, heavy molded glass.

*Capacity, ml	250	500	1000
Each	**$2.00**	**2.30**	**2.65**

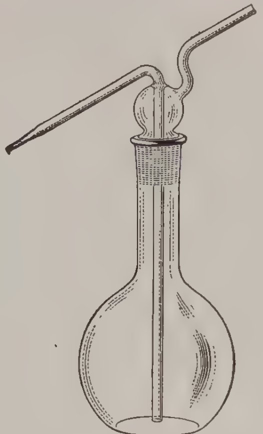
**Sizes recommended by American Chemical Society, Standardization Committee*



3-395



3-400



3-405

3-395. BOTTLES, Washing, Pyrex Glass, consisting of a heavy Ring-Neck Pyrex Flask, rubber stopper, and glass tubes bent at the proper angle. The delivery tube is in two pieces connected by means of a piece of rubber tubing so that the stream of liquid is easily directed. Being made from a Pyrex Flask, this Washing Bottle is very satisfactory because of its resistance to temperature changes and its mechanical strength.

*Capacity, ml	500	1000
Each	**$ .60**	**.80**

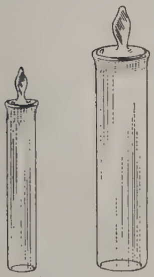
3-400. BOTTLES, Washing, Wicker Covered Neck, for use with hot solutions; made of resistance glass, with rubber stopper and glass tubes. The outlet tube is in two pieces connected by rubber tubing. The wicker covering enables the bottle to be handled with a firm grip, and is the most convenient form of heat insulation.

*Capacity, ml	500	1000
Each	**$1.10**	**1.30**

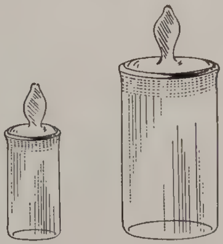
3-405. BOTTLES, Washing, for Ether, with glass tubes sealed in the stopper and the glass stopper ground to fit the bottle.

*Capacity, ml	250	500	1000
Each	**$1.25**	**1.75**	**2.00**

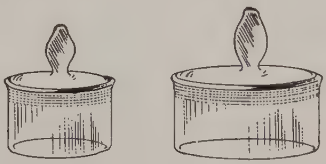
BOTTLES, Washing, for Gases, see Bottles, Gas Washing.



3-410



3-415



3-420

3-410. BOTTLES, Weighing, Cylindrical, High Form, of clear, lamp-blown glass, light weight. The ground-in, hollow glass stoppers have closed bottoms.

*Height, mm	50	80
Diameter, mm	15	15
Each	**$ .35**	**.40**

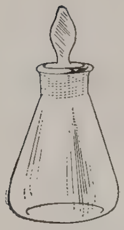
3-415. BOTTLES, Weighing, Cylindrical, Low Form, of clear, lamp-blown glass, light weight. The ground-in, hollow glass stoppers have closed bottoms.

*Height, mm	40	50	50	60	80
Diameter, mm	25	25	40	30	40
Each	**$ .40**	**.45**	**.65**	**.50**	**.70**

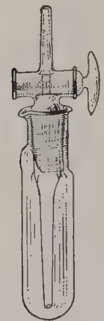
3-420. BOTTLES, Weighing, Cylindrical, Flat Form, of clear, lamp-blown glass, light weight. The ground-in, hollow glass stoppers have open bottoms.

*Height, mm	30	30	30
Diameter, mm	50	60	70
Each	**$1.40**	**1.80**	**2.20**

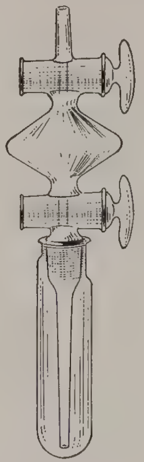
**Sizes adopted by the American Chemical Society, Standardization Committee*



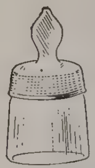
3-425



3-430



3-435



3-440

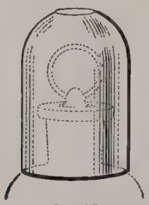
3-425. BOTTLES, Weighing, Conical, of clear lamp-blown glass, light weight. The ground-in, hollow glass stoppers have closed bottoms.

*Capacity approx., ml	15	30	60
Height approx., mm	55	65	75
Each	**$ .80**	**.90**	**1.00**

3-430. BOTTLE, Weighing, Grethen. Made of clear lamp-blown glass, with glass stopcock and ground-in glass stopper; for weighing fuming acids and corrosive liquids; capacity approximately 2 ml. **Each, $2.40**

3-435. BOTTLE, Weighing, Lunge. Made of clear lamp-blown glass, with two glass stopcocks and ground-in glass stopper; for weighing fuming acids and corrosive liquids; capacity approximately 15 ml. **Each, $4.00**

3-440. BOTTLE, Weighing, Parr, of clear, lamp-blown glass, with cover ground-on the outside; height, without cover, 20 mm.; diameter at bottom 25 mm. Used for weighing small samples of coal and other materials. **Each, $ .75**



3-442

3-443

3-442. BOTTLE CAPS, for Narrow Mouth Reagent Bottles, of heavy molded, clear flint glass; for protecting reagent solutions from dust. Bottom rims are ground and polished so that close contact is made with the shoulder of the bottle, and the tops have flat surfaces at right angles to the sides, enabling the bottle cap to be placed upside down without falling over and becoming contaminated. This cap can be used only with bottles having stoppers with coin-shaped heads. The sizes given are for our narrow mouth, lettered reagent bottles, No. 3-120 to No. 3-155, inclusive.

For bottles, capacity, ounces	4	8	16	32
Height inside, mm	58	60	62	70
Diameter inside, mm	36	42	44	46
Each	**$ .20**	**.20**	**.25**	**.25**

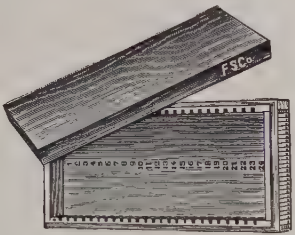
Per dozen, 15% discount.

3-443. BOTTLE REST, of **Hard Rubber,** outside **diameter 115** mm., for use with bottles whose diameter does not exceed 95 mm. **Each, $ .30**
Per dozen, $3.00

Sizes adopted by the American Chemical Society, Standardization Committee

For Large Slide Cabinets, see Microscope Slide Cabinets.

3-445



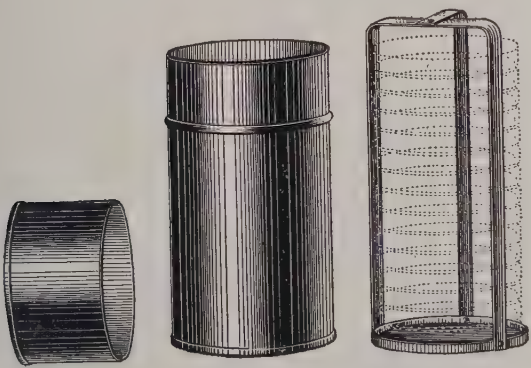
3-450

3-455

3-445. BOX, for 100 Microscope Slides, with wooden frame, heavy pasteboard top and bottom, hinged cover and two metal snap-clasps. The inside is carefully made, each numbered partition corresponds to a number in the Index on the inside of the cover, where a record may be kept of each individual slide. This box is made for standard slides, 25x75 mm. **Each $1.00**
Per dozen, 10% discount. **Per gross,** 20% discount

3-450. BOX, for 25 Microscope Slides, of wood sanded finish; the detachable cover fits over a shoulder on the top of the box. Each partition is numbered, corresponding to the Index on the outside end of the box. Made for standard slides, 25x75 mm. **Each, $ .15**
Per dozen, 10% discount. **Per gross,** 20% discount

3-455. BOX, Folding Form, for 20 Microscope Slides, of very heavy pasteboard, with two folding covers, each held closed by two metal clasps; arranged so the slides will lie horizontally. Each partition is numbered, corresponding to a number in the Index on the outside front covers. Made for standard slides, 25x75 mm. **Each, $ .50**
Per dozen, 10% discount. **Per gross,** 20% discount



3-460

3-465
3-470

3-475
3-480

3-460. BOX, Petri Dish, Sterilizing, made of polished copper, 4½ inches in diameter and 9 inches high. There is a removable tray which fits inside, which will hold 15 Petri dishes 100x10 mm. or 12 dishes 100x15 mm. This box is used for holding dishes in the sterilizer and as a protecting container for the sterile dishes. **Each, $4.00**

3-465. BOX, Pipette, Sterilizing, Round, Copper, used for sterilizing pipettes and other glass tubes. Made of polished copper, 2 inches diameter and 16 inches high over all, to accommodate the recently standardized Bacteriological Pipettes. The covers are about one-third the height, permitting the pipettes to be more easily removed, because they extend above the body of the box when the cover is removed. **Each, $3.00**

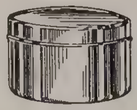
3-470. BOX, Pipette, Sterilizing, Round, Sheet Iron, similar to No. 3-465, but made of sheet iron, lacquered black. **Each, $1.75**

3-475. BOX, Pipette, Sterilizing, Rectangular, Copper, used for sterilizing pipettes and other glass tubes. Made of polished copper, 2½x1¾ inches and 16 inches over all, to accommodate the recently standardized Bacteriological Pipettes. The covers are about one-third of the height, permitting the pipettes to be more easily removed because they extend above the body of the box when the cover is removed. **Each, $3.75**

3-480. BOX, Pipette, Sterilizing, Rectangular, Sheet Iron, similar to No. 3-475, but made of sheet iron, lacquered black. **Each, $2.25**

3-485

3-490


3-495

3-500

3-485. BOXES, Metal, Seamless Aluminum, Non-rusting, with flat bottoms and straight sides. The covers can be fitted over the bottoms of the boxes, when opened, to prevent being lost. These aluminum boxes are often used for moisture determinations in soil analyses and are recommended for general use as containers for samples of various kinds, because of their non-rusting feature.

Diameter, inches	2	2½	3½
Height, inches	⅞	1¾	2
Each	$ .40	.70	.90

Per dozen, 10% discount.

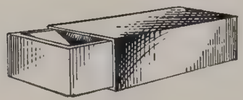
3-490. BOXES, Metal, Seamless Tin, Round, low form, flat bottoms. Sometimes called ointment boxes; used for samples, specimens, etc.

Capacity, ounces	½	1	2	4	8
Diameter, inches	1½	1⅞	2⅜	3	3¾
Height over all, inches	⅝	¾	1	1¼	1½
Per dozen	$.25	.30	.40	.60	.80

Per gross, 15% discount.

3-495. BOX, Metal, Asphalt Sample Cup, of seamless tin, round, high form; capacity 3 ounces, diameter 2³⁄₁₆ inches, height over all 1⅝ inches. For use in Drying Ovens, as recommended in A. S. T. M. Standard Specifications for 1921, page 732, Serial No. D 6-20, "Loss on Heating Oil and Asphaltic Compounds."
Per dozen, $ .60
Per gross, 10% discount

3-500. BOX, Metal, Cement Sample Cup, of seamless tin, round, high form; capacity 4 ounces, diameter 2⅜ inches, height over all 1¾ inches. Especially recommended for cement samples. **Per dozen, $ .70**
Per gross, 10% discount


3-505

3-510

3-515

3-505. BOXES, Pasteboard, Rectangular, of the sliding type. Made of stiff pasteboard and covered with white glazed paper.

Size	A	B
Length, inches	2¼	3
Width, inches	1¼	2
Height, inches	¾	1¼
Per dozen	$.20	.45

Per Package of ½ gross, 15% discount.

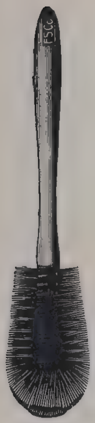
3-510. BOXES, Pasteboard, Round, so-called pill boxes, with projecting edges. Made of stiff pasteboard, white lined.

Size	A	B	C
Diameter, inches	1¼	1½	2
Height, inches	½	⅝	⅞
Per dozen	$ .20	.25	.35

Per Package of 1 gross, 15% discount.

3-515. BOX, Wood, Round, capacity about ½ ounce, diameter 1½ inches, height over all 1 inch, used for samples and specimens. The outside diameter of the box is reduced at the neck and the lid fits tightly over this.
Per dozen, $ .30
Per gross, 15% discount

BRUSHES



3-540

3-545

3-550

3-555

3-560

3-565

3-570

The brushes listed are those selected after careful consideration; each brush is completely described and the illustrations are exact reproductions of the brushes from our stock. From these one may choose a brush for every laboratory need.

3-540. BRUSH, Wooden Handle, Spiral Wound, Black Bristle, wired and countersunk into the wood so that the wires do not project. Made with extra heavy stiff tuft at the end, for cleaning the corners; diameter of bristle near the end 3 inches, length of bristle 4 inches, length over all about 12 inches. Used for Beakers, Jars, etc. **Each, $ .60**
Per dozen, 10% discount

3-545. BRUSH, Wooden Handle, Four Row, Double Tuft, Black Bristle. The bristles are on four rows of twisted wire arranged around the handle so that the total diameter of the bristle part is 3½ inches; length of bristle part 5½ inches and length over all about 12½ inches. The double tuft at the end facilitates cleaning the corners. Used for Beakers, Jars, etc. **Each, $ .65**
Per dozen, 10% discount

3-550. BRUSH, Wooden Handle, Four Row, Black Bristle. The bristles are on four rows of twisted wire arranged so that the total diameter of the bristle part is 3 inches; length of bristle part 4½ inches and length over all about 12 inches. Used for Beakers, Jars, etc. **Each, $ .40**
Per dozen, 10% discount

3-555. BRUSH, Wooden Handle, Two Row, Black Bristle. The bristles are on two rows of twisted wire, with small tuft at the end, arranged so that the diameter across the rows is 3 inches and across the side 2 inches; length over all about 15 inches. This is the most popular "Beaker Brush." **Each, $ .35**
Per dozen, 10% discount

3-560. BRUSH, Wood and Metal Handle, Two Row, Tufted End, Black Bristle. The bristles are made on two rows of twisted wire attached to a rigid flat strip of metal which is inserted in a ferruled wooden handle, painted black; greatest diameter 2½ inches; length of bristle part 5 inches, length over all about 12½ inches. Used for Beakers, Small Jars, etc. **Each, $ .45**
Per dozen, 10% discount. **Per gross,** 20% discount

3-565. BRUSH, Swivel Joint, Heavy Wire Handle, Single Row, Tufted End, Black Bristle. The bristles are on one row of twisted wire attached to the handle by means of a swivel joint; this permits the brush part to conform to various shaped glassware, such as Bottles, Jars, etc. Diameter of bristle part 1½ inches, length of bristle part 4½ inches; length over all about 12 inches. **Each, $ .25**
Per dozen, 10% discount. **Per gross,** 20% discount

3-570. BRUSH, Flexible, Flat Metal Handle, Single Row, White Bristle. The bristles are on one row of twisted wire attached to a piece of "clock-spring" steel, which readily adjusts itself to the inside surface of Flasks, Bottles, etc.

For Flasks, capacity, ml.	250	500	1000
Diameter of Bristle Part, inches	1½	1½	1¾
Length of Bristle Part, inches	2½	3½	4½
Length over all, inches	12	15	18
Each	$ .35	.40	.45

Per dozen, 10% discount. **Per gross,** 20% discount

BRUSHES FOR TEST TUBES

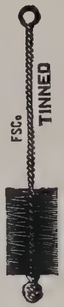
3-575

3-580

3-585

3-590

3-595



3-600

3-605

3-610

REGARDING BRUSHES

There is a wide variation in the size and quality of laboratory brushes. Each brush in this catalogue is completely described and its illustration has been made from the stock brush which will be supplied.

A saving can be made by purchasing brushes in the larger quantities mentioned. Brushes can be kept in perfect condition in the stock-room by placing them in covered boxes, along with some moth balls.

3-575. **BRUSH, Test Tube, Brass Wire Handle, Spray-Tuft, Black Bristle.** Made so that the tuft presents an unbroken mass of bristles against the sides and bottom of the Test Tube or Bottle and no space is left untouched when the brush is revolved; diameter of bristle part 1½ inches; length of bristle part, without tuft 2½ inches; length over all 9 inches.
Per dozen, $1.20
Per gross, 20% discount

3-580. **BRUSH, Test Tube, Tinned Wire Handle, Spray-Tuft, Black Bristles.** Similar to No. 3-575 in all respects, except the Tinned Handle.
Per dozen, $1.00
Per gross, 20% discount

3-585. **BRUSH, Test Tube, Brass Wire Handle, Tufted End, Black Bristle.** For Test Tubes, Bottles, etc.; diameter of bristle part 1½ inches; length of bristle part, without tuft, 2½ inches; length over all 9 inches.
Per dozen, $ .85
Per gross, 20% discount

3-590. **BRUSH, Test Tube, Tinned Wire Handle, Tufted End, Black Bristle.** Similar to No. 3-585 in all respects, except the Tinned Handle.
Per dozen, $ .70
Per gross, 20% discount

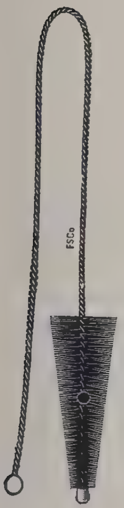
3-595. **BRUSH, Brass Wire Handle, Sponge End, Black Bristle.** For Test Tubes, Bottles, etc.; diameter of bristle part 1½ inches; length of bristle part 2½ inches; length over all 9 inches. The sponge end cleans the bottom of the test tube and acts as a protection against breakage.
Per dozen, $ .90
Per gross, 20% discount

3-600. **BRUSH, Test Tube, Tinned Wire Handle, Sponge End, Black Bristle.** Similar to No. 3-595 in all respects, except the Tinned Handle.
Per dozen, $ .70
Per gross, 20% discount

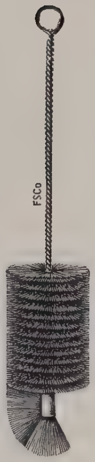
3-605. **BRUSH, Test Tube, Tinned Wire Handle, Black Bristle.** Diameter of bristle part 1½ inches; extreme length of bristle part 4 inches; length over all 9 inches. The sharp ends of the wires at the tip are bent upward to prevent scratching the bottoms of Test Tubes.
Per dozen, $ .60
Per gross, 20% discount

3-610. **BRUSH, Probang, Rattan Handle, Sponge End.** For cleaning Test Tubes and other small apparatus. Length over all 9 inches.
Per dozen, $ .70
Per gross, 20% discount

BRUSHES FOR BURETTES, CYLINDERS, PIPETTES AND TUBES



3-615



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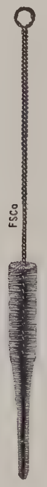
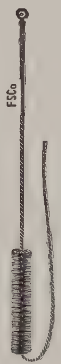
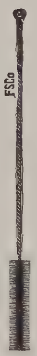


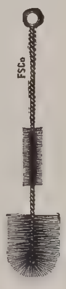
3-625



3-630



3-635



3-640

3-615. BRUSH, Burette, Tinned Wire Handle, Rubber Tipped, Black Bristle. For Burettes and long tubes. The bristle part is cone shaped; greatest diameter of bristle part 1½ inches; length of bristle part 5 inches; length over all 36 inches. The Rubber Tip reduces the risk of breakage. **Each, $ .15**
Per dozen, 10% discount

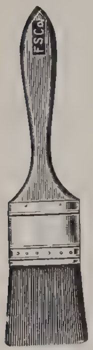
3-620. BRUSH, Cylinder, Tinned Wire Handle, Spray-Tuft, Black Bristle, for large Cylinders, Jars, etc. Diameter of bristle part 2¾ inches; length of bristle part, without Spray-Tuft, 4¼ inches; length over all 16 inches. The Spray-Tuft is arranged so that there is an unbroken mass of bristles against the sides and bottom of the vessel and no space is left untouched when the brush is revolved. Used for cleaning Graduated Cylinders, Hydrometer Jars, etc. **Each, $ .25**
Per dozen, 10% discount

3-625. BRUSH, Pipette, Tinned Wire Handle, White Bristle, for Pipettes. The bristle part is cone shaped; greatest diameter 1 inch; length of bristle part 7½ inches; length over all 17 inches. The lower half of the brush has soft bristles and the upper half has stiff bristles; this and the pointed end makes it adapted for cleaning Transfer Pipettes. **Each, $ .15**
Per dozen, 10% discount

3-630. BRUSH, Tube, Tinned Wire Handle, White Bristle, for small Tubes. Diameter of bristle part ½ inch; length of bristle part 3½ inches; length over all 23 inches. The bristles are soft and are in the middle of the brush, which permits the brush to be drawn back and forth in Tubes of small diameter.
Per dozen, $1.25
Per gross, 10% discount

3-635. BRUSH, Tube, Tinned Wire Handle, White Bristles, for small Tubes. Diameter of bristle part ½ inch; length of bristle part 3 inches; length over all 12½ inches. The bristles are fairly stiff and this brush can be used to clean tubes up to 7⁄16 inch inside diameter. It is convenient for cleaning straight Pipettes.
Per dozen, $1.00
Per gross, 10% discount

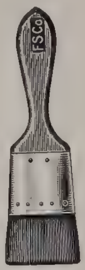
3-640. BRUSH, Babcock Bottle, Tinned Wire Handle, White Bristle, for Babcock Milk and Cream Test Bottles, and other small Bottles. The lower bristle part is 1½ inches diameter and 2 inches long; upper bristle part is ½ inch diameter, and 2½ inches long; length over all 10 inches. **Per dozen, $1.00**
Per gross, 10% discount


3-645

3-650

3-655

3-660


3-665

3-670

3-645. BRUSHES, Bristle Flat, for cleaning Ore Crushers and similar work. This brush is also suitable for painting.

Width of Bristle Part, inches	1	2	3	4
Length, over all, inches	7¼	8¾	10¼	10¼
Each	$ .20	.35	.65	1.35

Per dozen, 10% discount.

3-650. BRUSH, Assay Button, originally intended for cleaning lead and other Assay Buttons, but can be used where a very stiff and short bristled brush is desired. It is made by inserting the bristles into both ends of a brass tube ⅝ inches diameter and 2½ inches long; one end has black bristles and the other end has white bristles. Length over all 3¾ inches. **Each, $1.20**

3-655. BRUSHES, Hair, Single Quill, so-called "Camels-Hair Pencils." Made of very soft, brown hair. Used for marking samples, specimens, etc., and for cleaning small parts of apparatus.

Size	A	B	C
Length of Brush Part, mm	14	16	18
Length, over all, approx., mm	60	75	90
Per dozen	$ .20	.35	.50

Per gross, 15% discount.

3-660. BRUSH, Hair, Double Quill, so-called "Camels-Hair," made of very soft, brown hair; for dusting Balance and Scale Pans. Mounted in double quill handle; diameter at base, ½ inch; greatest diameter, ¾ inch; length of brush part, about 1¼ inches; length over all, 4 inches. **Each, $ .45**
Per dozen, 10% discount

3-665. BRUSHES, Hair, Flat Style, so-called "Camels-Hair." Made of very soft, brown hair; for dusting Balance and Scale Pans and other fine apparatus.

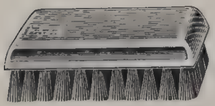
Width of Brush Part, inches	½	1	1½	2
Length, over all, inches	4¾	5¼	5¾	6¼
Each	$ .25	.30	.35	.45

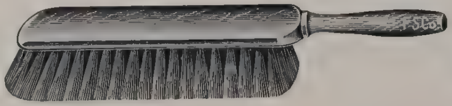
Per dozen, 10% discount.

3-670. BRUSHES, Hair, Round Style, so-called "Camels-Hair." Made of very soft, brown hair; for dusting Analytical Weights and other small laboratory articles; can also be used as marking brushes. The brushes have long wooden handles.

Diameter at base, mm	4	5	7
Length of Brush Part, mm	18	22	25
Length, over all, mm	200	210	220
Each	$ .15	.20	.25

Per dozen, 10% discount.


3-675


3-680

3-685

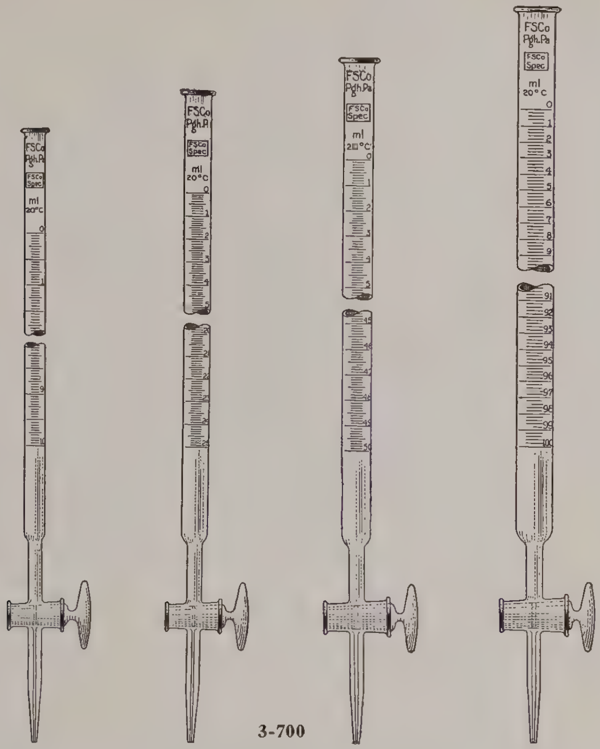
3-675. BRUSH, Scrubbing, for general utility. The wooden back is thick and has grooves for gripping and the bristles are stiff. The bristle part is 2 inches wide and 6 inches long. **Each, $ .70**
Per dozen, 10% discount

3-680. BRUSH, Table, for brushing off laboratory tables, desks, etc. The bristle part is 3 inches wide and 9 inches long; length over all 14 inches. **Each, $ .75**
Per dozen, 10% discount

3-685. BRUSH, for Metal Surfaces, Brass Wire Bristles. For cleaning Briquette Molds and for other similar work where a stiff metal bristle is necessary. Bristle part is ⅝ inch wide and 5 inches long; length over all 10 inches. **Each, $1.20**

BURETTES

F.S.Co. Spec.



3-700

REGARDING BURETTES

We have adopted two standards for the usual types of burettes; United States Bureau of Standards Specifications for burettes intended for the most precise work, and F. S. Co. Specifications for burettes intended for the usual volumetric analysis. The burettes listed have been standardized as to lengths, tips, stopcocks, numbering and tolerances of accuracy of calibration.

All of our burettes are graduated on the basis of the Liter—the unit of capacity equivalent to the volume occupied by the mass of 1 kilogram of pure water at its maximum density, 4° C. (practically) and under the standard atmospheric pressure of 760 mm. It is then adjusted to 20° C., which is the standard temperature adopted by the U. S. Bureau of Standards. One-thousandth part of this Liter is the "milliliter," abbreviated "ml.," the unit of volume of our burettes. *The term "cc" has been improperly used in the past to indicate this same volume.*

F. S. Co. Specifications

The lengths and diameters of these burettes, as well as the designs of stopcocks and tips and the methods of graduating and numbering, are all controlled by blue-prints and specifications with a view of utility and uniformity in these respects. As an additional control, we recheck a number of burettes from each lot before putting them into our stock.

Stopcocks—The outlets are capillary tubes drawn down and the plugs are carefully drilled so that the contents of the burette are delivered at a rate which can be easily controlled. The final grinding of the plugs into the shells is done carefully with a very fine abrasive, so that the ground joint will hold a vacuum of 15 inches of mercury.

The F. S. Co. Specifications are entirely satisfactory for burettes for the usual volumetric analysis and these burettes should be used for Industrial Control and Educational purposes. The limits of error of total or partial capacity are as follows:

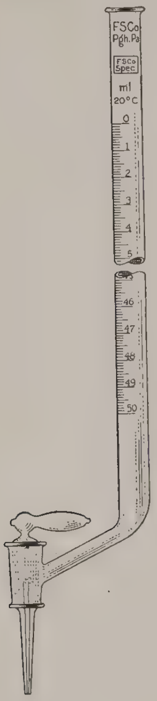
10 ml.	± 0.04 ml.	50 ml.	± 0.10 ml.
25 ml.	± 0.06 ml.	100 ml.	± 0.20 ml.

3-700. BURETTES, Straight Stopcock, F. S. Co. Specifications; made of clear glass. The quality of these burettes is controlled, as above explained, and we recommend them for volumetric analysis.

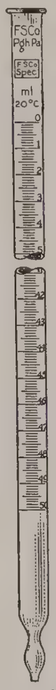
*Capacity, ml.	10	25	50	100
Smallest subdivisions, ml.	1/20	1/10	1/10	1/5
Each	**$1.35**	**1.55**	**1.75**	**2.20**

The U. S. Bureau of Standards specifies 100 ml. burettes to be graduated in 1/5 ml. subdivisions.

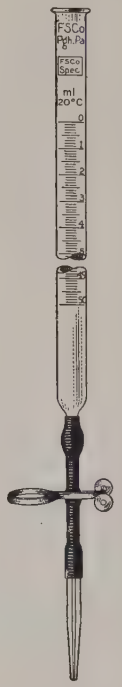
**Sizes adopted by the American Chemical Society, Standardization Committee.*



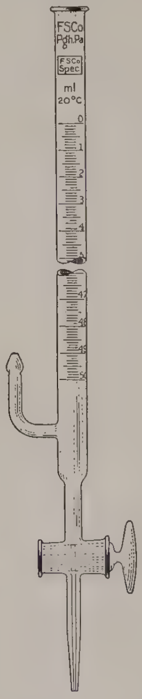
3-705



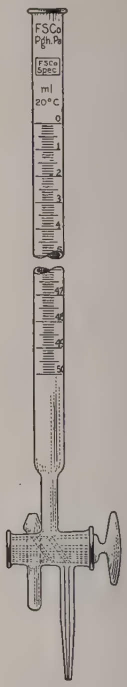
3-710



3-715



3-720



3-725

3-705. BURETTES, Bent Stopcock, F. S. Co. Specifications; made of clear glass. The quality of these Burettes is controlled according to F. S. Co. Specifications [*see page 107*], and they are recommended for volumetric analysis.

*Capacity, ml	25	50	100
Smallest subdivisions, ml	1/10	1/10	1/5
Each	**$1.80**	**2.00**	**2.65**

3-710. BURETTES, for Pinchcock, F. S. Co. Specifications; without Burette Attachment. Made of clear glass, according to F. S. Co. Specifications [*see page 107*].

*Capacity, ml	25	50	100
Smallest subdivisions, ml	1/10	1/10	1/5
Each	**$ .70**	**.90**	**1.10**

3-715. BURETTES, with Pinchcock Attachments, F. S. Co. Specifications. Made of clear glass, according to F. S. Co. Specifications [*see page 107*]

*Capacity, ml	25	50	100
Smallest subdivisions, ml	1/10	1/10	1/5
Each	**$ .95**	**1.15**	**1.35**

BURETTE PINCHCOCK ATTACHMENTS, see Nos. 3-880 and 3-885.

3-720. BURETTES, Straight Stopcock, with Filling Tube on the Side, F. S. Co. Specifications. Made of clear glass, according to F. S. Co. Specifications [*see page 107*].

*Capacity, ml	25	50	100
Smallest subdivisions, ml	1/10	1/10	1/5
Each	**$2.00**	**2.25**	**2.65**

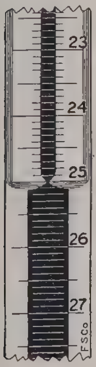
3-725. BURETTES, Three-Way Stopcock, with the tube for refilling turned up. Made of clear glass, according to F. S. Co. Specifications [*see page 107*], and recommended for volumetric analysis.

*Capacity, ml	25	50	100
Smallest subdivisions, ml	1/10	1/10	1/5
Each	**$2.00**	**2.35**	**3.00**

BURETTES, Gas Analysis, see Gas Analysis Apparatus.

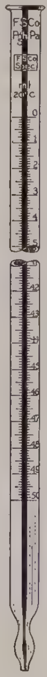
**Sizes adopted by the American Chemical Society, Standardization Committee.*

Liquid column *not* magnified above meniscus

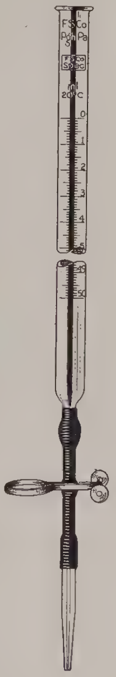


Liquid column magnified below meniscus

Fig. 1.

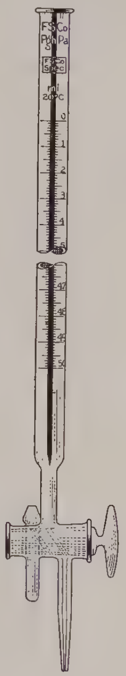


3-730

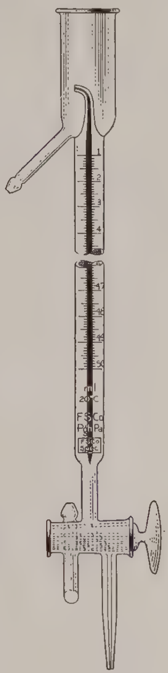


3-735

3-740



3-745



3-750

SCHELLBACH (Blue Line) BURETTES

Schellbach Burettes were devised to facilitate the reading of the meniscus. When viewed from the front, the liquid in the burette magnifies the blue line below the meniscus; the portion of the blue line above the meniscus appears without magnification, and, where the two lines meet, a point is formed at the meniscus, which is easily read. [*See Fig. 1.*]

If the Burette is turned about 15 degrees, and viewed from this angle, the line below the meniscus is still magnified but the upper end is reflected in the meniscus. The intersection of the line reflected in the meniscus and the line above the liquid is a definite point easily read.

All Schellbach Burettes are made according to **F. S. Co. Specifications** for volumetric analysis [*see page 107*], and are not made according to U. S. Bureau of Standards Specifications, as the Bureau has confined its certification to clear glass Burettes.

3-730. BURETTES, Schellbach, (blue line) **for Pinchcock, F. S. Co. Specifications;** without Burette Attachment. Made according to F. S. Co. Specifications [*see page 107*].

*Capacity, ml	25	50	100
Smallest subdivision, ml	1/10	1/10	1/5
Each	**$1.40**	**1.75**	**2.70**

3-735. BURETTES, Schellbach, (blue line) **with Pinchcock Attachment, F. S. Co. Specifications.** Made according to F. S. Co. Specifications [*see page 107*].

*Capacity, ml	25	50	100
Smallest subdivision, ml	1/10	1/10	1/5
Each	**$1.65**	**2.00**	**2.95**

3-740. BURETTE, Schellbach, (blue line) **Straight Stopcock, F. S. Co. Specifications.** Made according to F. S. Co. Specifications [*see page 107*], and recommended for volumetric analysis.

*Capacity, ml	25	50	100
Smallest subdivision, ml	1/10	1/10	1/5
Each	**$2.40**	**2.80**	**3.80**

3-745. BURETTE, Schellbach, (blue line) **Three-Way Stopcock, F. S. Co. Specifications;** with tube for refilling, turned up. Made according to F. S. Co. Specifications [*see page 107*], and recommended for volumetric analysis.

*Capacity, ml	50	100
Smallest subdivision, ml	1/10	1/5
Each	**$3.60**	**4.80**

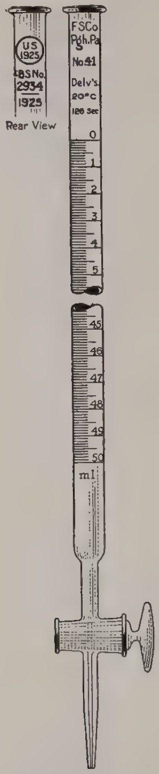
3-750. BURETTE, Schellbach, (blue line) **Automatic Zero, F. S. Co. Specifications.** With overflow cup and tube for draining it. **With Three-Way Stopcock** and the tube for refilling turned up. Made according to F. S. Co. Specifications [*see page 107*], and recommended for volumetric analysis.

Capacity, ml	25	50	100
Smallest subdivision, ml	1/10	1/10	1/5
Each	**$4.50**	**5.50**	**6.50**

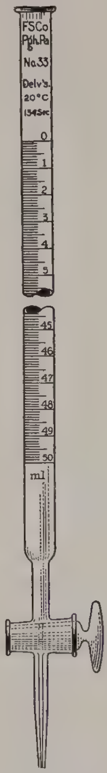
**Sizes adopted by the American Chemical Society, Standardization Committee.*

U. S. B. S. CERTIFIED

PRECISION BURETTES



3-755



3-760

3-755. BURETTES, CERTIFIED by the United States Bureau of Standards and supplied with their Certificate of Accuracy showing the corrections, if any. The burettes are made of clear glass, and have straight stopcocks; the whole milliliter marks are circular graduations; the time of outflow, in seconds, is engraved on each burette, and the Bureau of Standards' official mark and their number is engraved on the rear of the burette. The Bureau's Certificate of Accuracy, with the corresponding number, is supplied with each burette. The limits of error of total or partial capacity are as follows:

10 ml........	± 0.02 ml.	50 ml........	± 0.05 ml.
25 ml........	± 0.03 ml.	100 ml........	± 0.10 ml.

The Bureau of Standards' Certificate gives the official corrections, if any, at different points and only those burettes that have limits of error within their tolerances and comply with their specifications in all other respects receive these Certificates. Burettes with these Official Certificates showing the corrections therefore fulfill all the requirements for the most exacting and precise work, and this is the only type of certificate that we recommend.

We have **"U.S.B.S. Certified Burettes"** in stock for immediate delivery. It requires a long time to prepare burettes for sale, with U.S.B.S. Certificates, so we anticipate the needs of our customers many months in advance. This makes delays in transit to and from the Bureau, together with the time required for the burettes to go through the Bureau's tests, and the risk of breakage and rejections all annoyances of the past at the time the order is received.

Capacity, ml........	25	50	100
Smallest subdivisions, ml........	1/10	1/10	1/5
Each........	**$9.00**	**9.50**	**10.00**

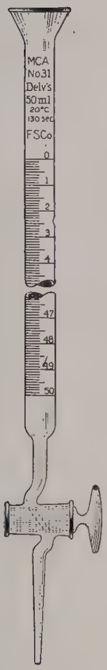
3-760. BURETTES, Precision Quality, U. S. Bureau of Standards Specifications, with straight Geissler stopcock; made of clear glass. These burettes are made and calibrated according to the method and specifications given in Circular No. 9 of the U. S. Bureau of Standards, Washington, D. C. The whole milliliter marks are circular graduations. The time of outflow, in seconds, is etched individually on each burette. The limits of error are those given under No. 3-755.

While these Precision Burettes are manufactured very carefully, we do not guarantee that every Precision Burette will pass all of the Bureau's tests and receive a certificate. However, we believe that they come within the Bureau's specifications, and these are the burettes that we send to the Bureau for certification.

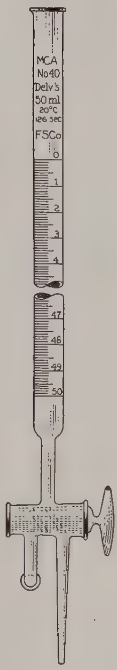
Unofficial Certificates are not supplied. Because of their "unofficial" nature, they represent very little value to the chemist desiring a precise statement of the accuracy of a burette. All certificates should be official and these are issued by the U. S. Bureau of Standards, Washington, D. C. For Precision Burettes with U. S. Bureau of Standards' Certificates, see No. 3-755.

Capacity, ml........	25	50	100
Smallest subdivisions, ml........	1/10	1/10	1/5
Each........	**$4.00**	**4.50**	**5.00**

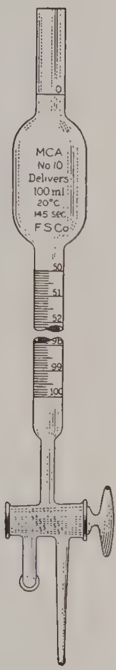
M. C. A. BURETTES



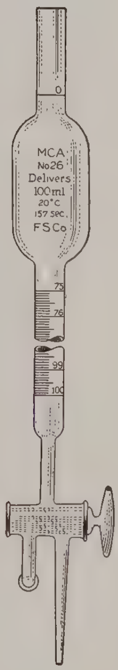
3-765



3-770



3-775



3-780

THE MANUFACTURING CHEMISTS' ASSOCIATION BURETTES are four standard designs, which have been adopted by this association of chemical manufacturers in the United States, among which are the following:

E. I. du Pont de Nemours & Co.
Barrett Company.
General Chemical Company.
Grasselli Chemical Company.
Solvay Process Company.
Powers-Weightman-Rosengarten Co.
Dow Chemical Company.
National Aniline & Chemical Co.
Mathieson Alkali Works.
Merrimac Chemical Company.

These burettes are precision quality, with tolerances equal to those established by the U. S. Bureau of Standards (Circular No. 9). The whole milliliter marks are circular graduations and the time of outflow is engraved on each individual burette.

They are made according to the detailed specifications set forth in "Standard Specifications for Laboratory Apparatus," Part 1 (1922), Manufacturing Chemists' Association.

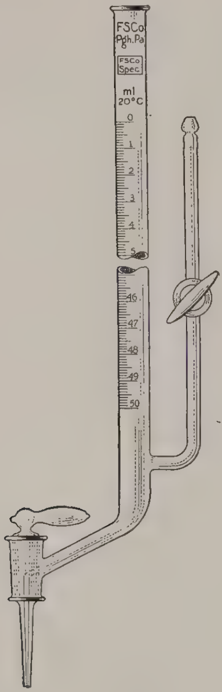
3-765. BURETTE, M. C. A. No. 1, with Funnel Top, capacity 50 ml.; smallest subdivision $^{1}/_{10}$ ml. The stopcock is bored obliquely and the quality of the burette is precision grade with circular graduations, as described above. **Each, $5.00**

3-770. BURETTE, M. C. A. No. 2, with Three-Way Stopcock, with one arm bent backward for filling purposes; capacity, 50 ml.; smallest subdivision, $^{1}/_{10}$ ml. The quality is precision grade, with circular graduations, as described above. **Each, $6.00**

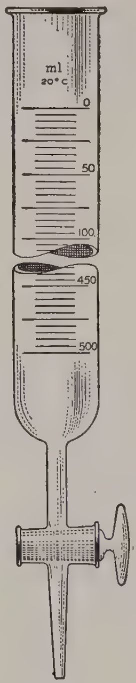
3-775. BURETTE, M. C. A. No. 3, with 50 ml. Bulb. The total capacity is 100 ml. and it is graduated from 50 ml. to 100 ml. in $^{1}/_{10}$ ml. divisions; with three-way stopcock for filling purposes; precision quality, with circular graduations, as above described. **Each, $7.50**

3-780. BURETTE, M. C. A. No. 4, with 75 ml. Bulb. The total capacity is 100 ml. and it is graduated from 75 ml. to 100 ml. in $^{1}/_{10}$ ml. divisions; with three-way stopcock for filling purposes; precision quality, with circular graduations, as above described. The graduated portion of this Burette contains 25 ml. and is the same length as the graduated portion of Burette No. 3-775 which contains 50 ml. Therefore, the graduation marks are twice as far apart and more easily read. **Each, $7.25**

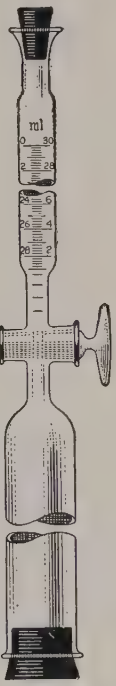
Burettes



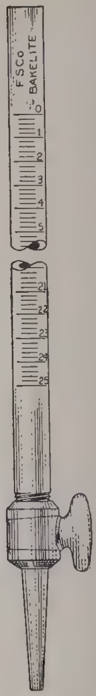
3-785



3-790



3-795



3-800

3-785. BURETTES, Gawalowsky, F. S. Co. Specifications, with Stopcock on the Filling Tube. The burette stopcock is set at an angle. Made of clear glass according to F. S. Co. specifications (*see page 107*), and recommended for volumetric analysis.

Capacity, ml	50	100
Smallest subdivision, ml	1/10	1/5
Each	**$3.50**	**4.50**

3-790. BURETTES, Dispensing, Straight Stopcock; made of clear glass. Very convenient for adding solutions in routine analysis. On account of the large diameter, these Burettes are not made to F. S. Co. specifications. They have the accuracy of similar sized Graduated Cylinders.

Capacity, ml	250	500	1000
Smallest subdivision, ml	1	5	10
Each	**$2.75**	**3.85**	**5.00**

3-795. BURETTE, SOIL ACIDITY, Carr, for determining the acidity of a soil by the Potassium Thiocyanate Method. The burette consists of two portions connected through a stopcock.

The upper portion is about eight inches long. It has a funnel shaped mouth and is fitted with a rubber stopper; it is calibrated to contain 30 ml., graduated in 0.2 ml. divisions, and is numbered up and down.

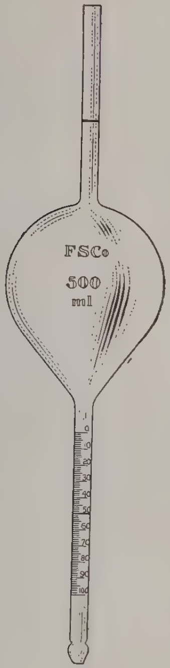
The lower portion is a large cylindrical chamber about twelve inches long, and has a capacity of about 150 ml. The lower end is closed with a rubber stopper.

Method. The method consists essentially of introducing a weighed sample of the soil into the lower portion of the burette, and plugging the mouth with a rubber stopper. The burette is then inverted and the potassium thiocyanate, measured in the graduated portion, is run over the soil. The burette is then shaken to aid in the extraction. Standardized alkali is then introduced into the graduated portion of the burette and measured. From time to time small quantities of this are admitted to the extraction chamber, and the quantity noted, until the solution changes color or shows the end point. From the total volume of alkali used, the acidity of the soil can then be calculated.

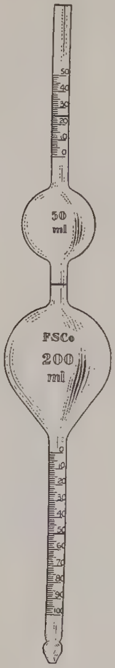
For further details of the method, see R. H. Carr, *Jour. Ind. Eng. Chem.* 13, 931 (1921), and Mahin and Carr, "Quantitative Agricultural Analysis" 266 (1923).

Burette, with stoppers, Each, $4.50

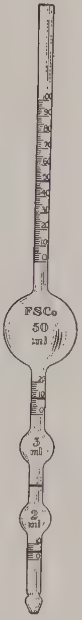
3-800. BURETTE, Bakelite—for Hydrofluoric Acid, with Straight Stopcock; made of amber colored Bakelite, graduated 25 ml. in 1/5 ml. The Bakelite is semi-transparent and enables the chemist to accurately measure small quantities of Hydrofluoric Acid without inconvenience. **Each, $20.00**



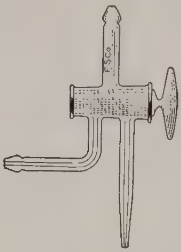
3-805



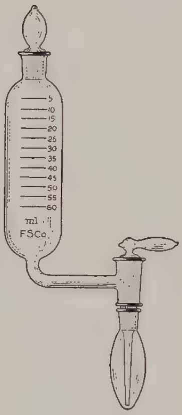
3-810



3-815



3-820



3-825

3-805. BURETTE, CALIBRATING, Morse, for 500 ml. Volumes. This Burette is used for calibrating volumetric apparatus in terms other than the true metric liter. In electrometric titrations, volumes are often measured at temperatures other than the standard temperature of 4° C. In Sugar Analysis, the volume is referred to 17.5° C. (Mohr's cc.) as a standard. In both of these cases, it is necessary to refer the volume of liquid under these conditions, to the volume the same quantity of liquid would occupy under standard conditions—or the true metric liter.

This Morse Burette is calibrated to deliver 500 ml. (true metric—4° C.) when the meniscus is dropped from the line above the bulb to the mark below the bulb marked 50. The lower stem of the burette is calibrated for a distance of 100 mm., subdivided in 1 mm., and numbered every 10 mm. This permits the determination of a point on the scale to correspond to a delivery volume of 500 ml. at any temperature from −30° to +30° C. The lower end is shaped for attaching rubber tubing. For additional information concerning calibration, graduation and use, see Morse and Blalock, *Amer. Chem. Jour.*, Vol. 16, 479 (1894). **Each, $8.00**

3-810. BURETTE, CALIBRATING, Morse, Double, for 200 ml. and **50 ml.** volumes. This burette is similar to the No. 3-805 Morse Burette, but has one additional bulb.

It is calibrated to deliver **200 ml.** (true metric), when the meniscus is dropped from the line on the constriction between the bulbs, to the 50 mark on the stem below the bulb. The lower stem of the burette is calibrated for a distance of 100 mm., subdivided in 1 mm., and numbered every 10 mm., both upward and downward. The burette is also calibrated to deliver **50 ml.** (true metric) from the mark on the constriction, to the 25 mark on the upper stem which is calibrated for a distance of 50 mm., and numbered every 10 mm., both upward and downward. This burette is used in a manner similar to the No. 3-805 Burette. **Each, $8.00**

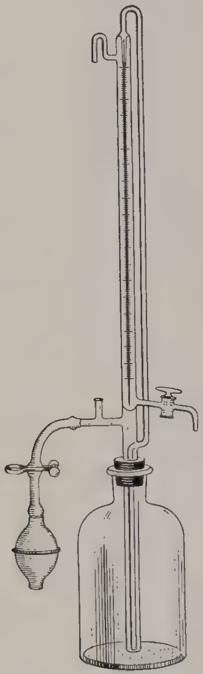
3-815. BURETTE, CALIBRATING, Morse, Triple, for 50 ml., 3 ml., and **2 ml.** volumes. This burette is similar to the No. 3-805 Morse Burette, but has two additional bulbs.

This burette is calibrated to deliver **50 ml.** (true metric) between the 50 mark on the upper stem and the 10 mark on the upper constriction. The upper stem is graduated for a distance of 100 mm., subdivided in 1 mm., and numbered every 10 mm. The upper constriction is graduated for a distance of 20 mm. in 1 mm., and numbered every 10 mm. The burette is calibrated to deliver **3 ml.** (true metric) between the 10 mark on the upper constriction and the single mark on the lower constriction. This burette is also calibrated to deliver **2 ml.** (true metric) between the single line on the lower constriction and the 5 mark on the lower stem. The lower stem is graduated for a distance of 10 mm., and is numbered at zero and 10. It is used in a manner similar to Burette No. 3-805. **Each, $8.00**

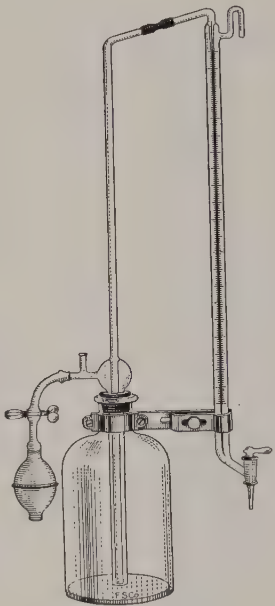
3-820. BURETTE STOPCOCK, Three-Way, with one arm bent for filling Morse Calibrating Burettes, No. 3-805, No. 3-810 and No. 3-815, directly from a reservoir. **Each, $3.00**

3-825. BURETTE, Ripper, Weighing. To be suspended from a balance hook by means of a wire; graduated 60 ml. in 5 ml. divisions. The glass stopper is ground-in and the drip cup is ground to fit over the outlet tube. **Each, $3.50**

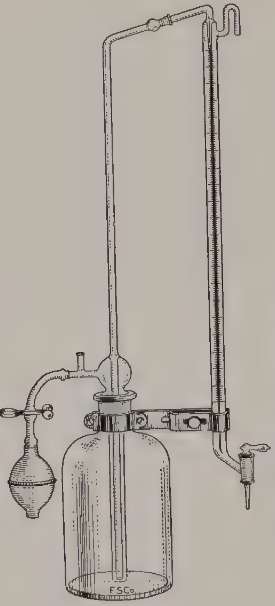
RESERVOIR BURETTES



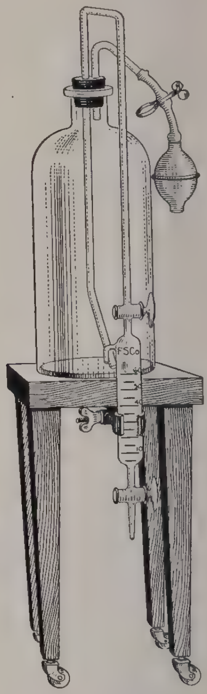
3-830



3-835



3-840



3-845
See also No. 3-850

3-830. **BURETTE, with RESERVOIR, Squibb, Type A.** This is the so-called "original" form, with the burette and filling tube sealed together in one piece and inserted into the reservoir through a rubber stopper. The reservoir holds about 2000 ml. and the burette, with blue-line background, is accurately graduated to 50 ml., in $^1/_{10}$ ml. divisions, and numbered every milliliter, reading down. The zero is established after allowing 20 seconds for drainage and a similar time should be allowed each time the burette is filled.

To fill the burette, cover the vent with the finger and introduce pressure into the reservoir, by means of the rubber bulb. This forces the liquid up through the filling tube. When the liquid in the burette reaches the overflow, release the finger and the excess will return to the reservoir. Supplied complete, with rubber bulb and pinchcock. **Each, $7.50**

3-835. **BURETTE, with RESERVOIR, Squibb, Type B, with rubber joints.** This is the so-called "improved" form, with the burette made as a separate piece and supported by an adjustable metal clamp attached to the neck of the reservoir. The filling tube is inserted into the reservoir through a rubber stopper and is connected to the burette by means of rubber tubing. These rubber connections make this burette well adapted for use with solutions which have a tendency to "freeze" ground joints.

The reservoir holds about 2000 ml. and the burette, with blue-line background, is accurately graduated to 50 ml., in $^1/_{10}$ ml. divisions, and numbered every milliliter, reading down. The zero is established after allowing a drainage time of 20 seconds and a similar time should be allowed each time the burette is filled.

The filling instructions are the same as those for No. 3-830. Supplied complete, with rubber bulb and pinchcock. **Each, $9.00**

3-840. **BURETTE, with RESERVOIR, Squibb, Type C, with ground joints.** This burette is similar to Burette No. 3-835, except that the filling tube is ground into the neck of the reservoir and connected to the burette by means of a ground joint. This all-glass construction is very convenient, except for use with solutions which have a tendency to "freeze" ground joints. For use with such solutions, we recommend Burette No. 3-835. Supplied complete, with rubber bulb and pinchcock. **Each, $11.00**

3-845. **BURETTE, with RESERVOIR, Johnson,** designed for the quick measuring of reagents, such as stock solutions, etc. The reservoir contains about 4000 ml. and the burette is accurately graduated to 60 ml., in 5 ml. divisions, and numbered every 10 ml., reading up. The wooden stand is on castors and can be conveniently moved about.

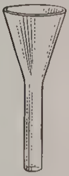
To fill the burette, close the upper glass stopcock, introduce pressure into the reservoir, by means of the rubber bulb, and close the pinchcock. Now open the upper glass stopcock, fill the burette and draw off as desired through the lower glass stopcock. As long as there is pressure in the reservoir, the burette can be refilled quickly by opening the upper glass stopcock. Supplied complete, with movable stand, iron clamp for holding the burette, rubber bulb and pinchcock. **Each, $15.50**

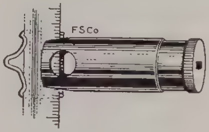
3-850. **BURETTE, with Filling Tube,** in one piece; for use with No. 3-845. **Each, $ 7.00**

BURETTE ACCESSORIES

3-855

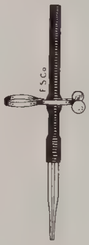
3-860


3-865

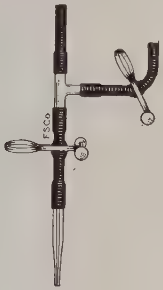


3-870

3-875



3-880



3-885

3-855. BURETTE CAP, of Glass, made to fit loosely over top of a 25 ml., 50 ml., or 100 ml. Burette, for protecting the contents from dust; inside diameter 23 mm.; height over all 40 mm. **Each, $ .10**
Per dozen, 15% discount.

3-860. BURETTE FLOAT, Vollhard, of Glass, Mercury Weighted, with 1 mm. projections to prevent the float from adhering to the inside of the burette; diameter including the projections 8 mm.; length over all 65 mm. This size is suitable for 25 ml., 50 ml. and 100 ml. Burettes. In use the Circular Etched Line is used, instead of the Meniscus, to obtain a clearer and more accurate reading. **Each, $ .75**

3-865. BURETTE FUNNEL, of Glass, for filling burettes. Diameter 25 mm.; length of stem 40 mm.; length over all 65 mm. **Each, $ .22**

3-870. BURETTE MENISCUS READER, for accurately reading Burettes and Thermometers. The Spring Clamp will fit any size tube from 6 to 16 mm. diameter and is therefore suitable for 10 ml., 25 ml., 50 ml. and 100 ml. Burettes. The barrel of the Meniscus Reader is nickel-plated and the lens is focused by drawing the eyepiece in or out. **Each, $3.00**

3-875. BURETTE OUTLET TUBE, of capillary glass tubing, outside diameter 6 mm.; inside diameter 2 mm. drawn to ½ mm. bore at tip; length 65 mm. Used to replace broken tips of outlet attachments on burettes without glass stopcocks. **Each, .10**
Per dozen, 15% discount.

3-880. BURETTE PINCHCOCK ATTACHMENT, for use with Burettes which do not have glass stopcocks. Consists of a capillary glass Outlet Tube (No. 3-875) with ½ mm. bore at tip; one piece of Scimatco Pure Gum Tubing 75 mm. long and 5 mm. bore, together with one Mohr Pinchcock. **Each, $ .25**
Per dozen, 15% discount

3-885. BURETTE PINCHCOCK ATTACHMENT, with Filling Tube, for use with Burettes which do not have stopcocks; enabling the burette to be filled from a reservoir. Consists of a capillary glass Outlet Tube (No. 3-875) with ½ mm. bore at tip; 3 pieces of Scimatco Pure Gum Tubing 75 mm. long and 5 mm. bore, also 2 Mohr Pinchcocks. **Each, $ .50**
Per dozen, 15% discount

REPAIRS

SPECIAL BURETTES

F. S. CO. GLASS ENGRAVING SHOP

Burettes of specifications other than those listed, are often desirable for special work. Our Glass Blowing and Engraving Shops make such burettes to order.

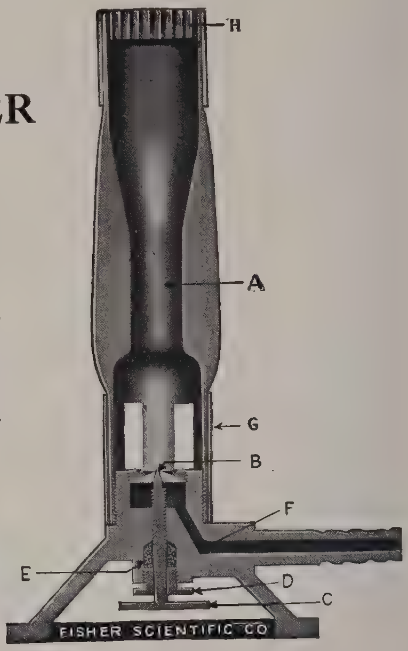
We can also attach new stopcocks to old burettes, where the calibration is not involved.

FISHER BURNER

Pat'd Jan., 1913 – Jan., 1921

NOTE: *The Fisher Burner has proven more satisfactory than any of the other so-called "high-temperature-burners" and is less expensive. We have, therefore, discontinued the manufacture of the Meker, Scimatco, and the other so-called high-temperature-burners.*

3-900



Cross-section of No. 3-900

3-900. BURNER, Fisher, High Temperature (*Patented*). **With pure nickel grid.** An improved high-temperature Burner with pure nickel grid and injector-shaped tube; provided with air regulator and needle-valve gas regulation. Designed so that the same burner can be adjusted to produce the maximum temperature (*without blast*) when used with various gases (*except acetylene*) and at different gas pressures.

FLAME

The flame of the Fisher Burner is different from the Bunsen flame in every respect. Instead of the long narrow flame with a cold Bunsen cone and a hot tip, the Fisher flame is short and wide, has no cold cone and is uniformly hot throughout so that the entire flame is available for intensive heating. **The coldest part of the flame of the Fisher Burner is hotter than the tip of the Bunsen flame.** This hot flame is the result of a perfect mixture, and the speed of the gas through the burner, all of which is made possible by the design of the burner.

EFFICIENT

This burner replaces the blast burner for many purposes, thereby doing away with the noise, the expense of blast and effecting a saving in gas consumption.

Platinum ware should always be heated with a Fisher Burner, as the non-reducing flame increases its life. In one laboratory where the crucibles lasted for 500 to 600 combustions when heated over a Blast Burner, 5000 combustions were made when the Fisher Burner was used.

The time required to bring about a desired result is greatly reduced by using the Fisher Burner. Tests showed, in bringing water to the boiling point, a saving of 25% in time over that required by Bunsen type burners, also a saving of 37% in the gas consumption. For operations requiring higher temperatures, the saving in time and gas was greater.

SAFE

Note from the cross-section of the Fisher Burner, that the needle-valve has a packing gland "E," tightened by the screw "D." No. 3-960 is the only other laboratory burner with this safety feature. A separate inlet for the gas "F," brings the gas up to the orifice "B." The gas-inlet tube and the base are cast in one piece, thereby eliminating the joint at this point. The outside diameter of the first ridge on the gas-inlet tube is 7½ mm. so that ¼ inch (6 mm.) tubing will fit tightly and each succeeding ridge is slightly larger; this makes a gas-tight connection that won't pull off in moving the burner. **Back-flashing is prevented by the nickel grid** "H" which is 30 mm. diameter and 10 mm. thick, and contains 100 square openings.

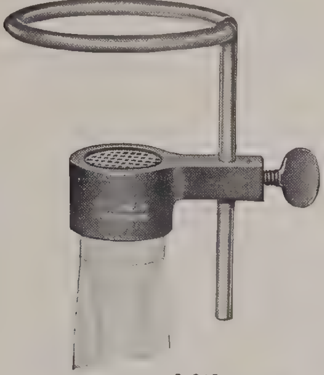
NON-RUSTING

No iron or steel is used in this burner. The injector-shaped tube "A" is made of brass as is also the air regulator "G," the needle screw "C," and the packing screw "D." The grid "H" is made of pure nickel and the base is a one-piece nickel-alloyed white metal casting.

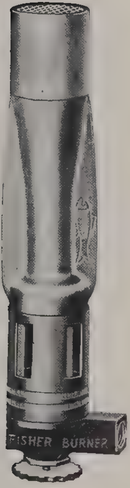
INEXPENSIVE

The price of this burner is just about one-half of the price of other high-temperature burners, none of which contains the features of this burner. This low price has been made possible because we make it in our own shops in large quantities, with special dies, tools and automatic machinery. **Each, $2.00**

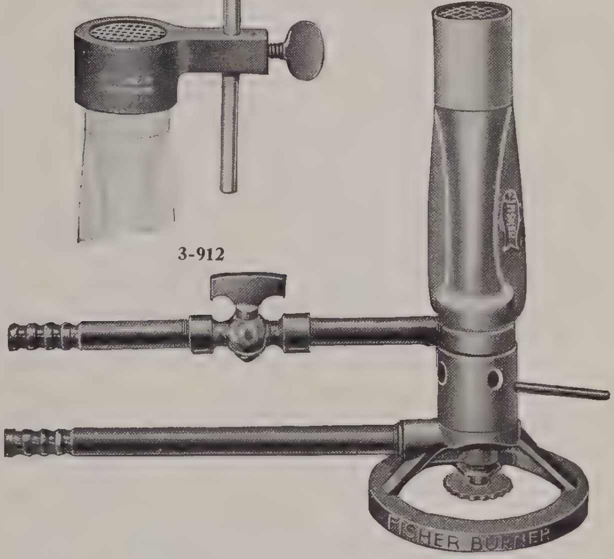
In 100 lots, Each, $1.90



3-912



3-905



3-910

3-905. BURNER, Fisher, Utility Model. (*Patented*), **with pure nickel grid.** This burner is the same as No. 3-900 except that it is made with a base which has a female thread for ⅛-inch pipe connection. It has all of the features described under No. 3-900, among which are the following:

The pure nickel grid, preventing back-flashing and making the burner safe.

The high temperature, without blast, produced from the short, wide Fisher flame, the coldest part of which is hotter than the tip of the Bunsen flame.

The substantial construction and low price, because we make the Fisher Burner in our own shops in large quantities, with special dies, tools and automatic machinery.

This type of Fisher Burner is used where a burner is desired for permanent connection, singly or in rows, for furnaces, for ovens, for heating large vessels, or for other laboratory operations. Many Fisher Burners are also used in the shops and manufacturing plants for various heating operations. The Westinghouse Electric Company has adopted it for heating soldering irons. **Each, $2.00**

3-910. BURNER, BLAST, Fisher (*Patented*). This burner has all the features of the No. 3-900 Fisher Burner, but is made to use compressed air with the gas and, thereby, produces a flame of higher temperature. The air-inlet tube, for compressed air, and the gas-inlet tube are each 6½ inches long.

The flame of this burner is different from other Blast Burners; it is short and wide, has a series of small blue heat-cones near the grid, and is extremely hot throughout. It is not adapted where a long, needle-shaped flame is desired, but is the burner to use where a flame of large volume and intense heat is desired, because the total heat produced by this Burner is greater than that produced by any of the usual laboratory Blast Burners.

The compressed air is introduced through a ring containing many small openings so that perfect mixing and speed is the result. This produces the intensively hot flame.

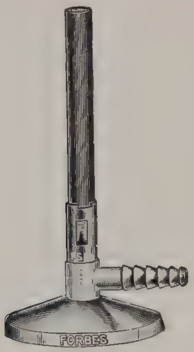
The pure nickel grid at the top of the burner **prevents back-flashing;** this is 30 mm. diameter, 10 mm. thick and contains 100 square openings.

The gas is regulated by the needle-valve underneath the burner; the atmospheric air is regulated by a ring with handle attached, and the compressed air is regulated by a brass stopcock on the inlet tube.

Each, $4.50

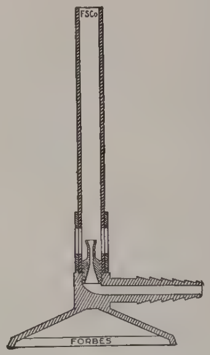
3-912. BURNER SUPPORT, Fisher. Fits on the top of Fisher Burners and holds the apparatus being heated. The adjustment for height regulates the rate of heat transfer; to increase heat, lower the support; to decrease heat, raise the support.

Each, $ .40



3-915

FORBES
BUNSEN BURNER



Cross-section of No. 3-915

3-915. BURNER, Forbes-Bunsen. This is the simple and inexpensive Bunsen burner, which we have completely redesigned in accordance with the principles of combustion and the latest manufacturing methods. It has many features not found in the old Bunsen burner, but it costs no more.

Description. (*See cross-section illustration.*) The base and the gas inlet tube are cast in one piece; the corrugations on the gas inlet tube taper and will take undersized or stretched ¼-inch rubber tubing and make a gas-tight connection; these corrugations are shaped to grip the tubing and prevent it from slipping off. The burner tube measures 11 mm. outside diameter.

The gas inlet is constructed to allow free and unobstructed passage of the gas as it flows to the upright burner tube through the injector. The injector is made of brass, flattened, and can be opened or closed by the operator to suit the particular gas that is being used.

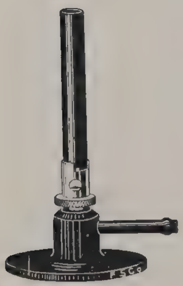
There are two rectangular air regulators, which have ⅓ more capacity than the ordinary Bunsen burner. This is the reason of the clear, blue flame obtained with high B. T. U. gases.

Materials. The base and gas inlet tube are made in one piece of nickel-alloyed white metal; the gas injector is made of brass and the tube and air regulator are also made of brass. No iron or steel is used in the burner.

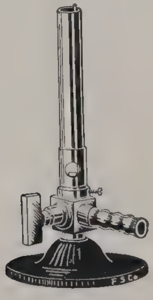
Features. More stable because of the low wide base; no leaks at the junction of the base and the gas-inlet tube because these are made in one piece; gas-tight tubing connection, because of the tapered inlet tube; tubing won't slip off because the corrugations grip it; will produce clear, blue flames of different lengths with different kinds of gases, because of the adjustable gas injector and the wider range of air regulation; won't rust because no iron or steel is used in the burner.

The low price is possible, because we employ labor saving machinery and quantity production methods in making the Forbes-Bunsen Burners.

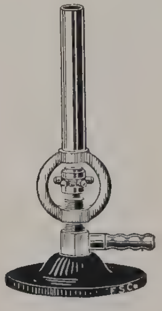
Each, $.30
Each, in 100 lots, .25
Each, in 500 lots, .20



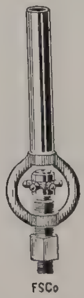
3-920



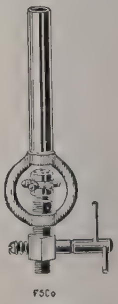
3-940



3-950



3-955



3-957

3-920. BURNER, Bunsen, with 13 mm. Tube. A large size burner; height over all 150 mm.; mounted on a black enameled iron base. **Each, $1.50**
Per dozen. 10% discount.

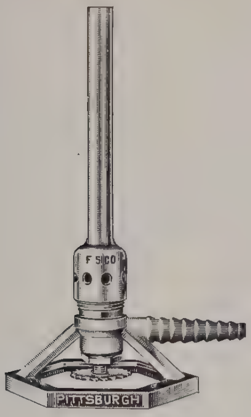
3-940. BURNER, Bunsen, Pilot Flame, with stopcock on the gas supply line, air regulator, also regulating screw on the pilot flame supply tube; diameter of brass tube 13 mm.; height over all 150 mm.; mounted on a black enameled iron base. **Each, $1.80**

3-950. BURNER, Fletcher, with air and gas regulators, adjustable for use with gasoline gas and other gases; diameter of brass tube 13 mm.; height over all 165 mm.; mounted on a black enameled iron base. **Each, $1.35**

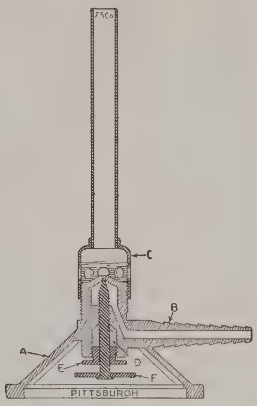
3-955. BURNER, Fletcher, without Iron Base, similar in construction to No. 3-950, but made with threaded connection for screwing directly into the gas supply line; used with Kjeldahl Digesting Shelves, and where a permanently connected burner is desired. The threaded connection measures ⅜ inch and is known as a ⅛-inch I. P. thread. **Each, $1.10**

3-957. BURNER, Fletcher, with Government Stopcock; used by the U. S. Bureau of Chemistry. This burner is similar to No. 3-955 and is supplied without iron base, but has, in addition, a special stopcock, with two handles set at right angles to each other. **Each, $2.00**

PITTSBURGH
UNIVERSAL BURNER



3-960



Cross-section of No. 3-960

3-960 BURNER, **Pittsburgh-Universal. A new burner, with many features,** which will produce a blue Bunsen flame of different lengths, using any kind of gas (except acetylene). This style of burner is used in many College and Industrial Laboratories. The height over all is 155 mm. and the outside diameter of the burner tube is 11 mm.

The flame produced is a clear blue Bunsen flame and, by means of the air and gas regulation provided, this flame can be made as small as ¾ of an inch high or it can be made 12 inches high. The intensity of the flame can be regulated so that this burner is adapted for a wide range of laboratory work from very slow heating to quick boiling. (For high-temperature operations, see Fisher Burner No. 3-900.)

Construction. The base "A" and the gas inlet tube "B" is a one-piece, white-metal casting; the burner tube and the air regulator "C" is made of brass; there are eight separate air inlets which effect thorough mixing. The packing-gland "D" is tightened by the brass screw "E" and the gas regulating needle "F" is made of brass. The entire burner is made to precision tolerances; each piece is neat and clean-cut, the threads fit accurately and the needle is accurately centered in the valve.

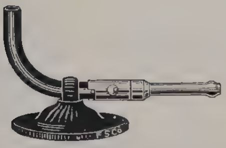
This burner will not rust. There is no iron or steel used in its manufacture.

This burner is gas tight; the gas inlet is a separate passage up to the valve; there is no joint between the gas inlet-tube and the base: the packing-gland prevents leaks around the needle.

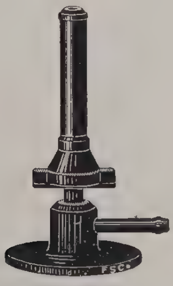
Rubber tubing won't slip off because of the tapering ridges on the gas inlet-tube which are shaped to grip the tubing; undersized or stretched ¼ inch rubber tubing can be put on tightly.

The low price of this Pittsburgh Burner, with its features, materials and precision workmanship, is possible because we make them in our own shops in large quantities, by means of special dies, tools and automatic machines. **Each, $ .90**

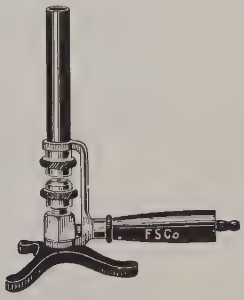
In 100 lots, Each, $ .80



3-965



3-970



3-975

3-965. BURNER, **Bunsen, Low Form,** with air regulator and slotted, brass nipple inside the burner tube; diameter of tube 11 mm.; length over all 75 mm.; height over all 140 mm.; mounted on a black enameled iron base. **Each, $ .60**

Per dozen, 10% discount

3-970. BURNER, **Bunsen—Acetylene,** for use with acetylene gas only. The burner is heavily built to withstand high pressures. The burner tube is 14 mm. outside diameter with a 5 mm. orifice at the top. Height over all 150 mm.; mounted on a heavy, black enameled iron base. **Each, $2.15**

3-975. BURNER, **Universal, with Handle,** adjustable for both air and gas; burns equally well with natural, coal or gasoline gas. Diameter of brass tube 13 mm.; height over all 160 mm.; mounted on black enameled, iron tripod base. The wooden handle facilitates handling the burner. **Each, $2.30**

ACCESSORIES FOR VERTICAL TUBE BURNERS

3-980

3-985

3-990

4-010

3-995

4-000

4-005

3-980. BURNER CHIMNEY, with Support, made of polished iron; diameter of top 40 mm.; diameter of bottom 50 mm.; permanently attached to the support, which fits over any 11 mm. burner tube. The set screw enables the chimney to be attached to the burner tube at any height desired. **Each, $ .75**

3-985. BURNER CHIMNEY, without Support, for use with No. 3-990 Chimney Support; made of polished iron, conical shaped; diameter of top 40 mm.; diameter of bottom 50 mm.; height 50 mm. **Each, $ .15**
Per dozen, 15% discount.

3-990. BURNER CHIMNEY SUPPORT, Burner Star, for use with No. 3-985 Chimney. The height of the chimney on the burner tube is regulated by a set screw in the chimney support. This support fits a burner tube 11 mm. diameter. **Each, $ .25**

3-995. BURNER FLAME SPREADERS, Wing Tops; made of brass, to slip over top of the burner tubes. These wing tops produce a broad, flat flame, convenient for bending glass tubes. The 11 mm. size fits the usual Bunsen Burner No. 3-915.

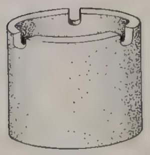
For burner tubes, outside diameter, mm	11	13
Each	$ .12	.15

Per dozen, 10% discount. **Per gross,** 20% discount.

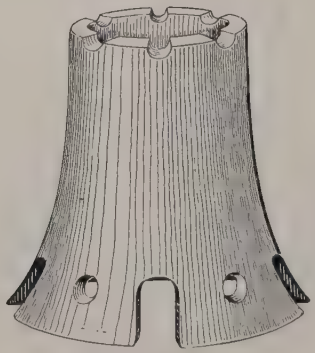
4-000. BURNER FLAME SPREADER, Gauze Top; made of brass, diameter of top 40 mm.; fits over any 11 mm. burner tube; produces a large round flame. **Each, $ .35**

4-005. BURNER TIP, for Blowpiping, made of brass, with rest for blowpipe; outside diameter 13 mm. to fit over 11 mm. burner tubes. This tip produces a broad, narrow flame. **Each, $ .15**

4-010. BURNER TUBE, for Blowpiping, made of brass, with rest for blowpipe; outside diameter 8 mm.; length over all 130 mm. to fit inside 11 mm. burner tubes. This tube produces a broad, narrow, yellow flame. **Each, $ .20**



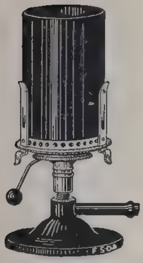
4-015



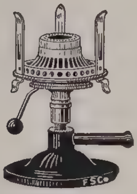
4-020

4-015. BURNER FURNACE, Erdmann Chimney, made of porous clay; diameter 95 mm.; height 85 mm.; thickness 10 mm., with 10 mm. notches for supporting a triangle on which to place a crucible. When this chimney is placed on a 5-inch tripod, a small furnace can be made with any vertical tube gas burner. When used with No. 3-900 Fisher Burner, a crucible can be heated to a very high temperature, without using blast. **Each, $1.10**

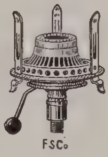
4-020. BURNER GUARD, Vitrified Earthenware, for protecting the burner flame from drafts; also serves as a rigid, non-corrosive support for vessels to be heated. The top has notches to hold grids or other forms of supports. Height 225 mm.; diameter of top 125 mm.; diameter of bottom 200 mm. **Each, $ .85**



4-025
See also No. 4-045

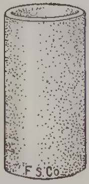


4-030



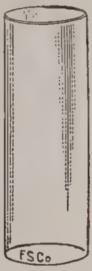
4-035

4-040



4-050

4-055



4-060

4-025. BURNER, Argand, with Polished Iron Chimney, burner of brass, on black enameled iron base; height over all 145 mm. Flame is adjustable and can be turned down very low for a slow, even heat. Can be used with natural gas or coal gas. **Each, $1.60**

4-030. BURNER, Argand, without Chimney, similar to No. 4-025; on black enameled iron base; height over all 100 mm. **Each, $1.40**

4-035. BURNER, Argand, without Chimney or Base, similar to No. 4-025, with threaded nipple for screwing directly into gas supply line. The threaded nipple measures $\frac{3}{8}$ inch and is known as a $\frac{1}{8}$-inch I. P. thread. The nipple can be removed and the female connection screwed directly to a $\frac{1}{8}$-inch I. P. connection. **Each, $1.20**

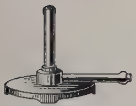
4-040. BURNER CHIMNEY, Aluminum, for Argand burner; diameter 50 mm.; height 75 mm.; heavy wall; will not break or rust. **Each, $ .35**

4-045. BURNER CHIMNEY, Polished Iron, for Argand burner; diameter 50 mm.; height 75 mm. **Each, $ .20**

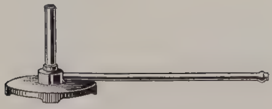
4-050. BURNER CHIMNEY, Clay, for Argand burner; diameter 50 mm.; height 100 mm. **Each, $ .60**

4-055. BURNER CHIMNEY, Mica, for Argand burner; diameter 50 mm.; height 130 mm. **Each, $ .35**

4-060. BURNER CHIMNEY, Glass, for Argand burner, made of heat resisting glass; diameter 50 mm.; height 150 mm. **Each, $ .35**



4-065



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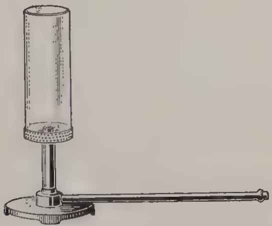


4-075

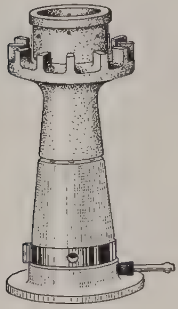
4-080

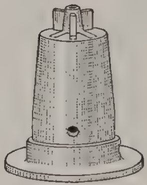
4-065. BURNER, MICRO, Nickel-plated; diameter of tube 6 mm.; height over all 55 mm.; length of gas-inlet tube 40 mm. A very small flame can be obtained with this burner making it suitable for use with paraffine baths, etc., where a low heat is required. **Each, $ .65**

4-070. BURNER, MICRO, Long Inlet Tube, all nickel-plated, similar to No. 4-065, but with gas-inlet tube 135 mm. long. **Each, $1.00**

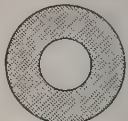
4-075. BURNER, MICRO, with Glass Chimney, similar to No. 4-070, with glass chimney 28 mm. diameter supported by a nickel-plated chimney holder which slips loosely over the burner tube; height over all 135 mm.; length of inlet tube 135 mm. **Each, $1.50**

4-080. BURNER CHIMNEY, Glass, for Micro Burner No. 4-075, diameter 28 mm.; height 85 mm. **Each, $ .30**


4-085


4-090

4-100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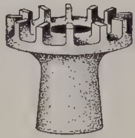
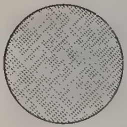
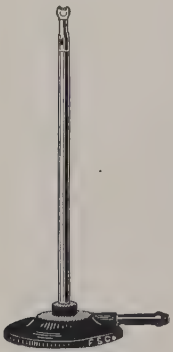

4-095


4-110

4-085. BURNER, Chaddock, a durable, clean and non-corrodible burner consisting of a heavy glazed porcelain base, a "castle-top" support and ring chimney both of unglazed white clay, two asbestos discs 115 mm. diameter, one asbestos ring with 50 mm. hole in center and 115 mm. diameter, air regulator of copper and glass inlet tube for gas. This burner is recommended for use in chemical hoods and other places where a metal burner is attacked by fumes. Height over all 250 mm. **Each, $4.00**

4-090. BURNER BASE, of glazed porcelain, for No. 4-085........ **Each, $2.70**
4-095. VESSEL SUPPORT, Castle-Top, for No. 4-085........ **Each, $ .75**
4-100. TRIANGLE SUPPORT, Clay Ring, for No. 4-085........ **Each, $ .35**

4-105. ASBESTOS DISC, for No. 4-085........ **Each, $ .20**
4-110. ASBESTOS RING, for No. 4-085........ **Each, $ .15**
4-115. TIP FOR GAS, of glass, for No. 4-085........ **Each, $ .15**


4-120

4-125

4-130

4-135

4-120. BURNER, Illuminating, with brass upright tube 300 mm. long including tip; on black enameled, heavy iron base; height over all 325 mm. **Each, $1.35**

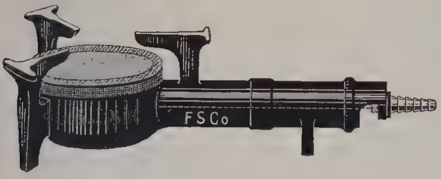
4-125. BURNER, Ring Form, of brass; with 2 mm. holes. Provided with air regulator; suitable for attaching to support rods by means of clamp holders, when heating laboratory apparatus.

Diameter of flame, mm	100	150
Length over all, mm	300	350
Each	**$2.00**	**2.50**

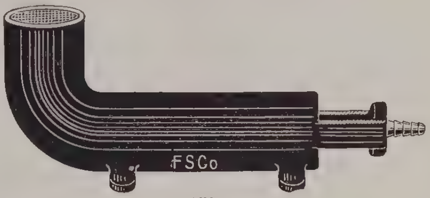
4-130. BURNER, Fletcher Evaporating, of Copper. Made with lap joints, without solder; height over all about 40 mm.; diameter 100 mm.; flame is blue and smokeless and suitable for heating glass and porcelain vessels because no cold air can reach the hot part of the dish. **Each, $5.00**

4-135. BURNER, Fletcher Radial, of annealed cast iron and very strong; produces a large, round flame without a point in the center.

Diameter of burner ring, mm	90	125
Diameter of stand, mm	165	200
Gas consumed per hour, cu. ft	12	18
Each	**$3.00**	**3.70**



4-140
See also No. 4-145

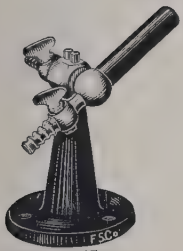


4-150

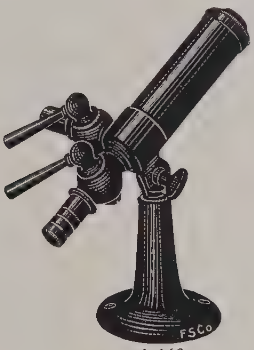
4-140. BURNER, Fletcher Solid Flame, of cast iron; produces a large solid flame which will boil large volumes of water quickly. Diameter of burner surface 110 mm., with perforated cap of copper; provided with supports for vessels. **Each, $2.50**

4-145. BURNER CAP, Perforated, of copper, for No. 4-140 burner. ....**Each, $ .60**

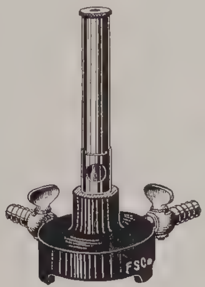
4-150. BURNER, LARGE, Bunsen Type, made of cast iron; provided with a gauze top 60 mm. diameter. Burner is 310 mm. long and 125 mm. high. This burner produces a large blue flame and is used to heat Furnaces, Autoclaves and other large apparatus. **Each, $3.25**



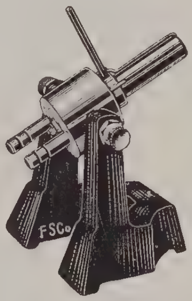
4-155
See also No. 4-156



4-160



4-165



4-170

BURNER, BLAST, Fisher, Improved Form, see No. 3-910.

4-155. BURNER, BLAST, Bunsen, for various gases; diameter of tube, 18 mm., with movable sleeve. Supplied with three tips, each having a different sized opening; provided with separate stopcocks for gas and air; arranged so that flame may be directed at different angles; on heavy, black enameled, iron base. This burner is suitable for glass-blowing and can be regulated to a fine pointed flame. **Each, $4.00**

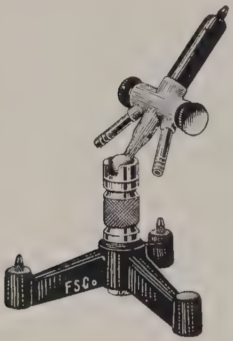
4-156. BURNER, BLAST, Special, for Natural Gas. This Burner is similar in appearance to No. 4-155, and has all the adjustments mentioned under that number, but the gas and air distribution is different. Natural gas is richer than artificial gas and when the proper amount of air for correct combustion is introduced into the other types of Blast Burners, they invariably blow out. We were compelled to devise a burner which would work satisfactorily with natural gas for use in our own shops.

This is the Burner that we devised to meet the requirements when used with Natural Gas, and is the only one we know that is thoroughly satisfactory for working glass over the natural gas flame. **Each, $5.75**

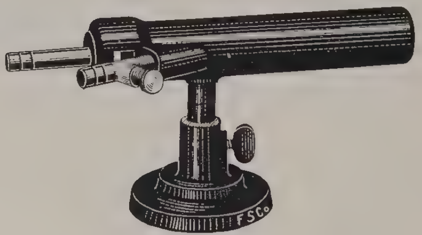
4-160. BURNER, BLAST, Large, Bunsen, for various gases; diameter of tube 35 mm.; movable sleeve; two tips; separate stopcocks for regulating gas and air; adjustable to many angles; mounted on black enameled, heavy iron base, about 150 mm. high. This burner produces a large hot flame. **Each, $10.00**

4-165. BURNER, BLAST, Fletcher. On low base with vertical tube. Diameter of tube 18 mm. with cap at top having 6 mm. hole in center; separate stopcocks for gas and air; the base is heavy iron, black enameled; height over all 170 mm. **Each, $5.25**

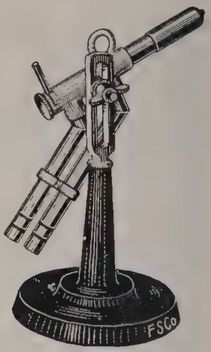
4-170. BURNER, BLAST, COMPOUND, Fletcher. Made of brass nickel-plated, constructed on the principle of a stopcock having a ground key so that there is no leakage of gas; flame may be adjusted from a fine pointed jet to a large powerful flame by moving the lever which regulates both gas and air automatically. By turning the lever to the right, a small flame, and by turning the lever to the left, a large flame may be produced. When the lever is in the center the main gas stream is turned off, but the Pilot Flame continues to burn. This Pilot Flame is controlled by a set screw. The Blast Burner is mounted on a very heavy, black enameled, iron base, and is adjustable for directing the angle of the flame. Diameter of tube 20 mm.; height to top of cast base 110 mm. **Each, $12.50**



4-175



4-180



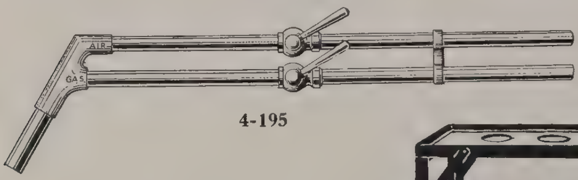
4-185
See also No. 4-190

4-175. BURNER, BLAST, M. I. T. Pattern. With needle valves for regulating gas and air; diameter of tube 20 mm., made with ball and socket joint so that the flame may be directed horizontally as well as at other angles; movable sleeve; provided with three tips; mounted on black enameled iron tripod base. The burner is readily detachable on account of the ball and socket joint and may be used as a hand blowpipe. **Each, $6.25**

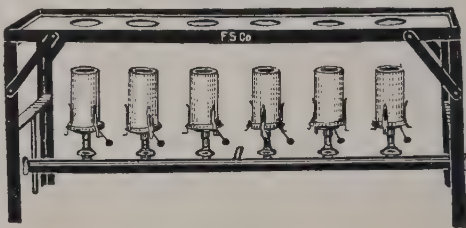
4-180. BURNER, BLAST, Horizontal, Fletcher. Made of cast iron with tube 35 mm. diameter, provided with gauze disc 28 mm. diameter; with brass fittings; on black enameled, heavy iron base; with set screw for adjusting the height; length over all 290 mm. Provided with screw to regulate the gas. This burner is used successfully with a number of furnaces, and produces a large and very hot flame. **Each, $4.50**

4-185. BURNER, BLOWPIPE, Fletcher Automatic, on Stand, for adjusting to any angle. This Blast Burner is made of brass and designed so that the flame is controlled by means of a Combination Valve, which regulates both air and gas at the same time. The maximum gas consumption is 54 cu. ft. an hour and should be supplied through a pipe not less than $\frac{3}{8}$-inch diameter inside. The stand is iron, black enameled, and made with a slot so that the blowpipe can be set at the height and angle desired and then clamped in this position. **Each, $7.00**

4-190. BURNER, BLOWPIPE, Fletcher Automatic, Hand. Exactly as described under No. 4-185, except that the Burner is supplied without the stand and intended for holding in the hand. The Combination Valve is then easily controlled by the thumb, leaving the other hand free. **Each, $5.50**



4-195

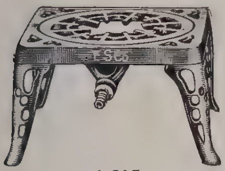


4-200

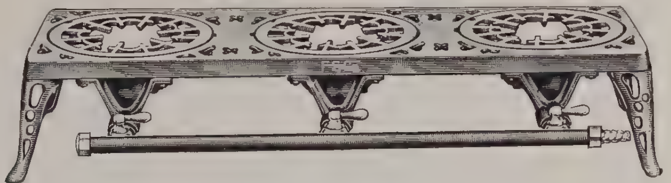
4-195. BURNER, BRAZING, Blowpipe, made of brass, with separate Stopcocks, lever style, for controlling the air and gas. The Air Tube is $\frac{3}{16}$-inch inside diameter and the Gas Tube $\frac{7}{16}$-inch inside diameter; length over all 14 inches. This Burner is suitable for brazing and the gas supply should come from a $\frac{3}{8}$-inch gas line. **Each, $2.50**

4-200. BURNER, Gas Hot Plate, Johnson-Argand, designed by Dr. Edward S. Johnson; rigid, compact and easily controlled, consisting of 6 Argand Burners, with Clay Chimneys, regulated by separate stopcocks. The top is heavy asbestos with 6 holes, $2\frac{1}{4}$ inches diameter, directly over the burners. Length 27 inches; width $8\frac{1}{2}$ inches; height 11 inches. There is an adjusting device for raising and lowering the burners. **Each, $27.50**

EXTRA CLAY CHIMNEYS, see Burner Chimney, No. 4-050.



4-205

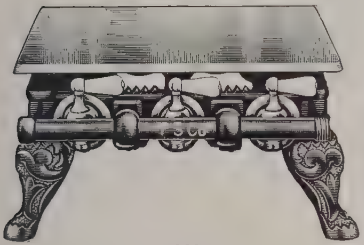


4-215
See also No. 4-210

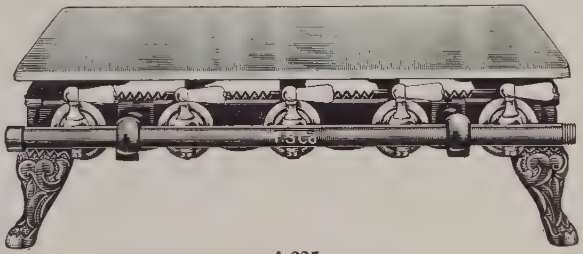
4-205. BURNER, Gas Hot Plate, One Burner, made of grey cast iron, with a removable, flush grate top 7 inches diameter; the top is 8¼ by 8¼ inches and is 5¼ inches high; the burner is 3½ inches diameter, fitted with hose connection. **Each, $3.00**

4-210. BURNER, Gas Hot Plate, Two Burners. Made of grey cast iron, with removable, flush grate tops, each 7 inches diameter. The top is 8¼ inches by 17¼ inches, and is 5¼ inches high; each burner is 3½ inches diameter and is equipped with a separate lever stopcock. This hot plate is similar to No. 4-215, except that it has two burners instead of three. **Each, $4.50**

4-215. BURNER, Gas Hot Plate, Three Burners. Made of grey cast iron with removable, flush grate tops, each 7 inches diameter. The top is 8¼ inches by 26½ inches and is 5¼ inches high; each burner is 3½ inches diameter and is equipped with a separate lever stopcock. **Each, $6.50**



4-220

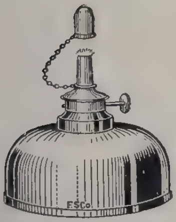


4-225
See also No. 4-230

4-220. BURNER, Gas Hot Plate, Polished Steel Top, with two Burners arranged so that there are no cold spots over the entire surface. The top is polished steel and **14 inches wide** and **18 inches deep;** the base is heavy cast iron and the hot plate is 7½ inches high over all. The gas inlet pipe is threaded for permanent connection; each burner has a separate lever valve so that the flames can be closely regulated and one or more burners can be used as desired. This is a heavy and rugged hot plate that will last for years. **Each, $18.00**

4-225. BURNER, Gas Hot Plate, Polished Steel Top, with four Burners, similar to No. 4-220, but 24 inches wide and 18 inches deep. **Each, $26.00**

4-230. BURNER, Gas Hot Plate, Polished Steel Top, with five Burners, similar to No. 4-225, but 30 inches wide and 18 inches deep. **Each, $33.50**



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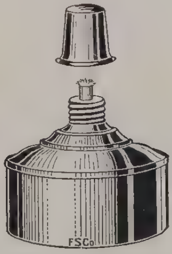

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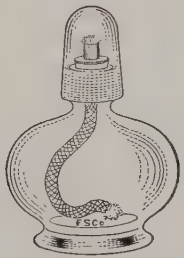


4-245

4-250

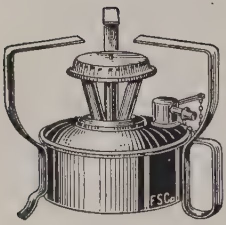
4-235. BURNER, Alcohol Lamp, Brass, with Ratchet, made with screw top and ratchet, for raising and lowering the wick. Supplied with metal cap for extinguishing the flame. Diameter of bottom, 90 mm.; capacity about 150 ml. **Each, $ .90**

4-240. BURNER, Alcohol Lamp, Brass. The wick holder can be unscrewed to replace the wick. A loose fitting cap is supplied to extinguish the flame. Diameter of bottom 75 mm.; capacity about 125 ml. **Each, $ .90**

4-245. BURNERS, Alcohol Lamps, Heavy Glass, with ground-on glass caps, for extinguishing the flame; complete with wicks and metal wick-holders.

Capacity, approx., ml	125	250
Greatest diameter, approx., mm	80	115
Each	**$ .50**	**.70**

4-250. BURNER WICKS, for Alcohol Lamps; a good quality of wick, about 6 mm. diameter and 150 mm. long; put up in packages of one dozen wicks. **Per package of 12, $ .15**
Per dozen packages, 10% **discount.**



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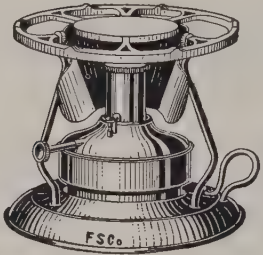
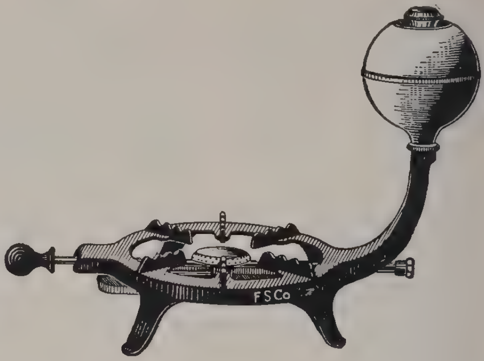


4-260



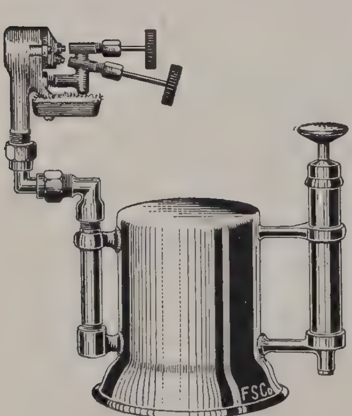
4-265

4-255. BURNER, Alcohol. Reservoir of nickel-plated brass 95 mm. diameter; tripod legs and support of nickel-plated iron; diameter of support 150 mm. This burner is lightly constructed but is efficient and safe; it will boil one liter of water in about 10 minutes and will burn approximately one hour without refilling; reservoir capacity 250 ml. **Each, $1.50**

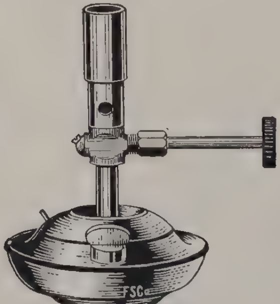
4-260. BURNER, Alcohol, with detachable shield for protecting the flame from drafts. The reservoir and base are of heavy brass and the grill of cast iron, all nickel-plated; reservoir capacity 250 ml.; diameter of grill 160 mm.; height over all 140 mm. This burner is designed for long service and produces a very hot blue flame with a comparatively small consumption of alcohol. **Each, $4.75**

4-265. BURNER, Alcohol, Barthel, solidly built with frame and grill of cast iron, enameled, other parts of brass; burns without wick, quietly and without soot; can be started quickly; it will boil one liter of water in about 6 minutes; flame may be regulated with safety and over a wide range of intensity; reservoir capacity, 500 ml., sufficient to burn full flame 90 minutes and a medium flame 5 to 6 hours. **Each, $5.50**

ALCOHOL, for Alcohol Burners, see Chemical and Reagent List at rear of this catalogue.



4-270



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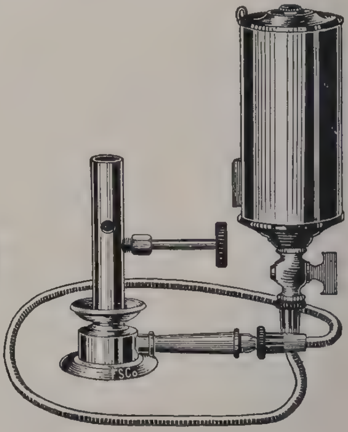
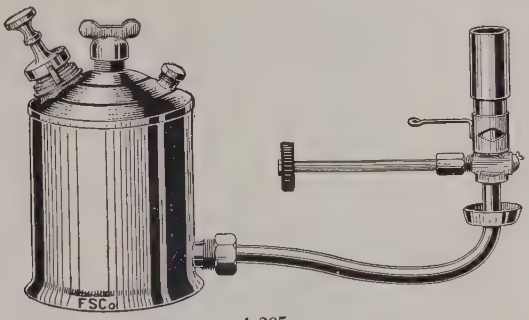


4-275

4-270. BURNER, Alcohol, Blast. Made of nickel-plated brass; reservoir 90 mm. diameter; 100 mm. high; capacity 500 ml.; fitted with a Double Jet Burner, designed for burning denatured or wood alcohol, and for producing a constant, clean blast flame of great intensity, sufficient to melt 25% platinum solder; designed so that the flame can be directed from various angles. **Each, $11.00**

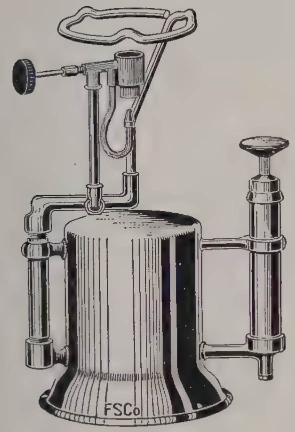
4-275. BURNER, Alcohol, Automatic Blast. The vaporization of the alcohol produces a flame similar to that obtained with blast. Consists of a reservoir, made of polished brass, equipped with a stopcock, with a capacity of 1000 ml.; a flexible metal hose, and a burner with tube 20 mm. diameter, and a total height of 180 mm. The heat produced is equivalent to that of 2 Bunsen burners. One filling is sufficient to operate full flame 4 to 5 hours in which a copper wire 2 mm. diameter will melt in one-half minute. The regulation of the flame is made by turning the handle and the height of the flame remains at the point so adjusted. Furnished complete with flexible metal hose 36 inches long. **Each, $10.75**

4-280. BURNER, Gasoline, Automatic Blast. The vaporization produces a flame similar to that obtained with blast. Made of polished brass; greatest diameter of reservoir 125 mm.; capacity 250 ml.; diameter of burner tube 22 mm.; height over all 175 mm. One filling is enough to burn full flame 90 minutes in which a copper wire 3 mm. diameter will melt in ¾ of a minute. For use with gasoline or benzine, Sp. Gr. 0.670 to 0.710. After starting and regulating, it burns with a steady, hot flame. **Each, $8.00**



4-285

4-285. BURNER, Gasoline, Blast, with Pump in Reservoir. Made of polished brass, reservoir 115 mm. diameter and 175 mm. high over all; capacity about 1000 ml. Diameter of burner tube, 25 mm.; with air and fuel regulating devices; produces a temperature of about 1400° C., with a smokeless, odorless and perfectly safe flame. For use with gasoline or benzine, Sp. Gr. 0.670 to 0.710. **Each, $15.00**



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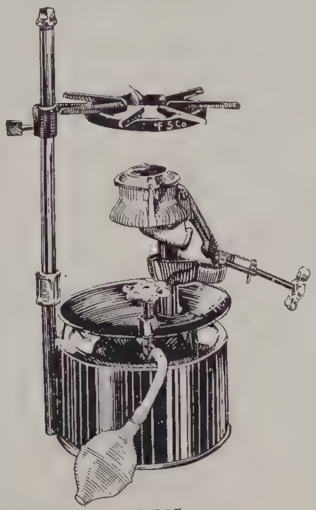
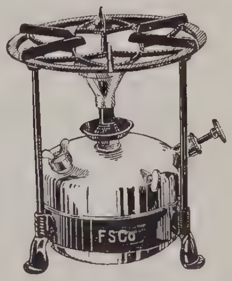


4-295



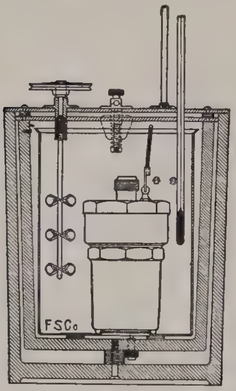
4-300

4-290. BURNER, Gasoline, Blast. Made of nickel-plated brass; reservoir 90 mm. diameter, 100 mm. deep; capacity 500 ml.; with pump for air pressure in handle; swivel adjustment for changing the direction of the flame; height over all 250 mm. Equipped with a support for holding the apparatus to be heated, which can be removed if desired. With reservoir half full, one pumping of air will operate the burner continuously for 1½ to 2 hours, giving clear blue flame which can be regulated as desired. **Each, $13.00**

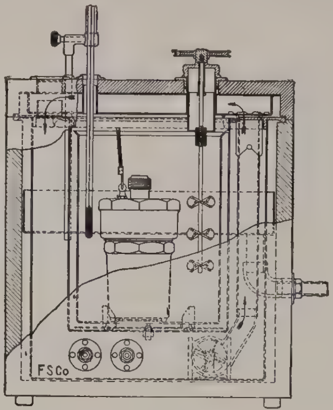
4-295. BURNER, Gasoline, Blast. Especially designed for laboratory use, provided with a heavy support rod and an adjustable ring support for holding flasks, beakers, etc. With ordinary pressure generated by means of rubber bulb, a temperature of 1100° F. is quickly obtained and this can be made hotter if desired. The reservoir is of black enameled sheet steel 165 mm. diameter and 100 mm. deep, capacity about 2000 ml. The fittings are of brass and cast iron and the apparatus support is 175 mm. diameter. Height, over all, 450 mm. **Each, $12.50**

4-300. BURNER, Kerosene Blast; a kerosene generating Burner, producing a silent, even and hot flame, for heating laboratory apparatus where gas is not available. Burner and reservoir of brass; cast iron apparatus support 200 mm. diameter, for supporting Flasks, Beakers, etc.; height over all 225 mm.; reservoir capacity 1250 ml. The burner can be removed from the reservoir and the plug, supplied with the outfit, inserted; this enables the Burner to be transported without emptying the reservoir. **Each, $7.00**

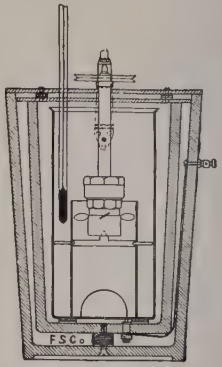
CALCIUM CHLORIDE JARS, see Drying Jars, page 312.
CALCIUM CHLORIDE TUBES, see Drying Tubes, page 313.
CALIPERS, see Measuring Appliances, page 431.



4-350
Cross-section of Parr Oxygen-Bomb Calorimeter



4-415 4-420
Cross-section of Parr Oxygen-Bomb Calorimeter with Adiabatic Jacket



4-430
Cross-section of Parr Peroxide Type Calorimeter

REGARDING CALORIMETERS

The true value of Coal, Oil, Gas, Food, etc., is its capacity to produce heat—its calorific power, or absolute heating effect. This value may be experimentally determined by burning a sample of the material, and measuring the amount of heat absorbed in a quantity of water placed in a jacket surrounding the combustion chamber. In actual practice, this may be accomplished in one of three ways:

1. **Oxygen-Bomb Method,** for solids and liquids.
2. **Sodium Peroxide Method,** for solids and liquids.
3. **Gas Combustion Method,** for vapors and gases.

1. **In the Oxygen-Bomb Method,** a weighed quantity of the solid material under examination is compressed into a tablet or, if a liquid, it may be absorbed by Naphthalene, Benzoic Acid, Soft Coal, etc., and then compressed, or the liquid can be confined in a thin glass balloon without the use of mixtures. The sample is then ignited by means of an electrically heated wire, in an atmosphere of Oxygen under pressure. The heat evolved during the combustion is absorbed in a weighed quantity of water in the jacket surrounding the combustion chamber, which jacket is carefully insulated against loss of heat through radiation.

2. **In the Sodium Peroxide Method,** the Oxygen necessary for the combustion is derived from Sodium Peroxide, with which the test sample has been intimately mixed (an accelerator, Potassium Chlorate, Benzoic Acid, Naphthalene, etc., may be added to the charge to facilitate ignition). This method, while perhaps not quite as accurate as the Oxygen-Bomb Method, has the advantage of low pressure work, does not require auxiliary gaseous oxygen, and leaves the products of reaction in the form of the sodium salt of the acids formed. This permits the determination of the Sulphur and the Carbon contents of a substance, directly from the same sample used for the ignition.

3. **In the Gas Combustion Method,** the vapor, or the gases to be tested, are passed at a measured rate, through a burner, the heat generated thereby being absorbed by water flowing through a jacket surrounding the combustion chamber, and measured both as to quantity, and inlet and outlet temperatures.

For further information regarding methods of calorimetry and the technique, see:

American Society for Testing Materials, *Standard Methods for 1924, Serial Designation D 22–1924 and D 129–22 T.*
S. W. PARR . . . . *Analysis of Fuel, Gas, Water and Lubricants.*
H. ABRAHAMS . . . . *Asphalt and Allied Substances, page 533, 1918.*
American Gas Association . . . . *Gas Chemists' Hand Book, 24, 1922.*
Bureau of Mines . . . . *Technical Paper No. 322, 81, 1922.*

HEAT UNITS - CALORIE versus B. T. U.

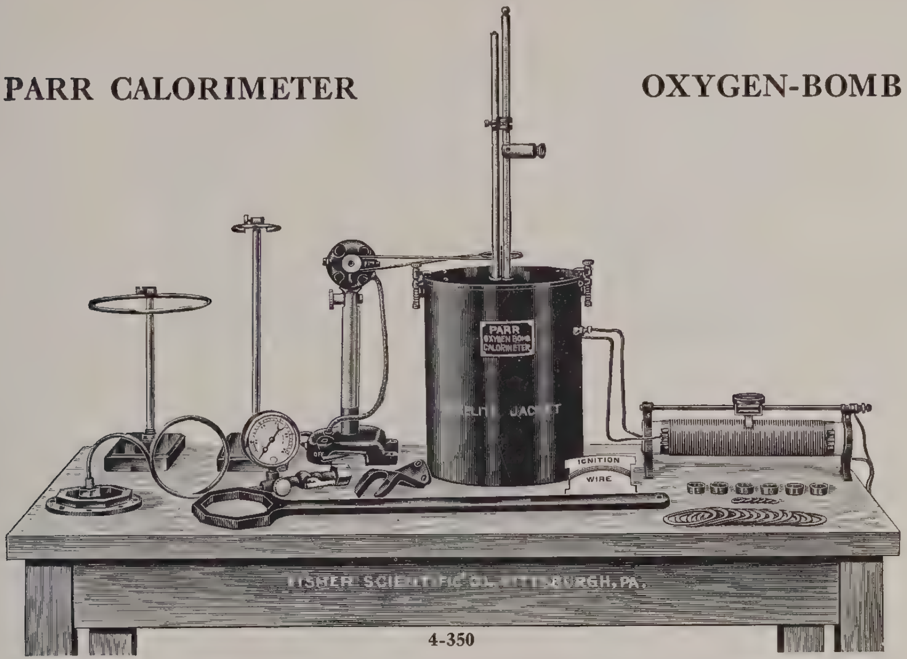
Calorific value may be expressed in either the Metric System (Calories) or the British System (B. T. U.). The **Calorie** is the amount of heat required to increase the temperature of one gram of water one degree Centigrade. The term Large Calorie, or Kilogram Calorie (Cal. or Kg. Cal.) is used to designate the quantity of heat required to increase the temperature of one kilogram (1000 grams) of water one degree Centigrade. The **British Thermal Unit** is the amount of heat required to increase the temperature of one pound of water one degree Fahrenheit. Since the Centigrade degree is 1.8 times as great as the Fahrenheit degree, and the kilo. is 2.2046 times the pound, it follows that the Calorie (Cal.) is equivalent to 3.968 true B. T. U.

However, since in industrial practice the B. T. U. value of coal is reckoned in terms of the heat of one pound of coal delivered to one pound of water, it follows that one gram of coal and one gram of water would have the same heat value. If one determination is measured with a Centigrade thermometer (calories per gram) and another with a Fahrenheit thermometer (B. T. U. per lb.) then the heat values would be in the ratio of 1 to 1.8. Therefore, we have the equation, **Calorie × 1.8 = (Industrial) B. T. U.**

SELECTION OF A CALORIMETER.

From the following Calorimeters and accessories one may select the equipment for carrying out any of the above mentioned methods. Each of these Calorimeters is of approved design, and has been used over a period of time, with complete satifaction. The selection offered, has been made after a study of the methods of manipulation, design and materials employed, and after consultation with the Laboratories that specialize in this work.

PARR CALORIMETER OXYGEN-BOMB


PARR OXYGEN BOMB CALORIMETER
BAKELITE JACKET
IGNITION WIRE
FISHER SCIENTIFIC CO. PITTSBURGH, PA.

4-350

4-350. CALORIMETER, Parr, Oxygen-Bomb of Illium, Bakelite Jacket. (Mahler-Atwater Type.) The materials and design of this calorimeter conform to the specifications of the A. S. T. M. Standard Methods for 1924, Serial Designation, No. D-22-24, for the Analysis of Coal. (*See cross-section drawing on page 128.*)

The method is the Oxygen-Bomb Method described under No. 1 in the Introduction just preceding.

Bomb. The vital part of a calorimeter is the Bomb, which is the feature of this equipment. It is cylindrical in shape, and is made of a solid, acid-proof, base-metal alloy, "Illium," and has no lining or facing of any kind. The Bomb is illustrated separately under No. 4-390.

Illium metal is extremely resistant to nitric and sulphuric acids, which are generated in the reactions involved in calorimetry; it has a tensile strength equal to that of steel, and it will take a high polish. For additional information as to the merits of Illium as an ideal material for Calorimeters, see *Chemical and Metallurgical Engineering,* Vol. 26, No. 15, April 12, 1922, and U. S. Bureau of Mines, *Technical Paper No. 91.*

Upward of 20,000 determinations have been made in a single bomb without deterioration of the interior. Illium, for calorimeter bombs, is a thoroughly reliable substitute for platinum, and bombs of this metal are now being used in the Fuel Testing Laboratory of the U. S. Bureau of Mines at Pittsburgh.

The bomb has a large capacity, which makes it well suited for determining the calorific value of coals, fuels, oils and foods.

Another feature of this bomb is the special check valve in the pressure line, which enables the bomb to be charged with oxygen without displacing the sample.

Ignition of the charge is effected by means of an electrically heated wire imbedded in the charge. Current for this may be obtained from the ordinary 110-volt lighting circuit by stepping it down with Rheostat No. 4-380.

Container and Bakelite Jacket. The water is held in an oval shaped metal container, which shape permits the rotary stirrer to be inserted on one side of the bomb, and the thermometer on the other side.

The container is surrounded by two concentric, Bakelite jackets with an air space between them. This method of insulation insures a uniformity of heat interchange, which, small as it is, can be accurately calculated. Mechanically, this Bakelite jacket is much stronger than the old fibre jacket.

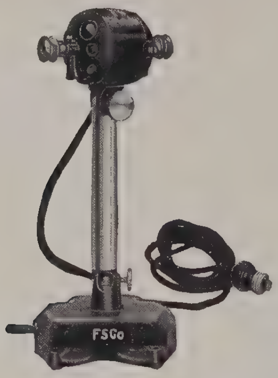
The water in the container is completely circulated by the propeller, driven by an electric motor.

The illustration shows the No. 4-350 Calorimeter equipment consisting of the Illium bomb, water container, insulating jacket, stirrer, oxygen connection for Linde tank, pressure gauge, 6 Illium metal fuel capsules, gaskets, thermometer holder, reading lens, card of ignition wire, ring support for jacket cover, split-ring support for the bomb cover, locking hinge for oxygen cylinder, bench socket for holding the bomb, large spanner wrench for bomb, and directions for using. The Motor, Rheostat and Thermometer are not included in this outfit. **Price of No. 4-350 Outfit, $300.00**

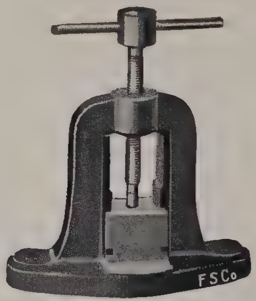
NOTE. *Illustration No. 4-350 shows Thermometer No. 4-355, Motor No. 4-375, and Rheostat No. 4-380 in their respective positions. These items are not included in the regular No. 4-350 outfit, and should, therefore, be specified separately.*

OXYGEN GAS IN TANKS, for use with the Parr Calorimeter. We recommend Linde oxygen because it is produced from the atmosphere (not electrolytic) and is free from hydrogen. It can be obtained from the Linde Air Products Co.

Calorimeter Accessories



4-375



4-378

4-355. CALORIMETER THERMOMETER, Certified, Etched Stem, for use with No. 4-350 Parr Oxygen-Bomb Calorimeter. This thermometer has a range of 65 to 90° F., graduated in 1/20 degrees; etched directly on the stem. It is 22 inches long, nitrogen filled, and provided with an expansion chamber, and a loop at the top for suspending it. It has a very long, narrow, mercury bulb, which insures great sensitivity, and very quick reaction to the slightest temperature change. **This thermometer has been tested by the U. S. Bureau of Standards, and is supplied with the Bureau's Certificate of Accuracy.** **Each, $12.00**

4-360. CALORIMETER THERMOMETER, Etched Stem, for use with No. 4-350 Parr Oxygen-Bomb Calorimeter. This thermometer is the same as No. 4-355, but is supplied **without Certificate.** The use of this thermometer is recommended where a certified thermometer is at hand for checking. **Each, $8.00**

4-365. CALORIMETER THERMOMETER, Beckmann, Certified, for use with No. 4-350 Parr Calorimeter or No. 4-505 Emerson Calorimeter. This is a differential type, indicating only the differences in temperature. Thermometers are made of well seasoned glass, with an auxiliary porcelain scale attached to the stem. Entire thermometer stem and scale are enclosed in an extra glass protecting case, and is fitted with a brass protecting cap, and suspension ring at the top.

Range, 5 degrees Centigrade, divided in 1/100 of a degree and capable of being read to 1/1000 of a degree with the aid of a small lens. Auxiliary scales reading –20 (meaning minus) to +160° C. are provided for setting the thermometer with any point of the Centigrade scale. This feature combines the accuracy of the Beckmann Type thermometer with the advantages of the standard Centigrade scale. These have been **tested by the U. S. Bureau of Standards, and are supplied with their Certificate of Accuracy.** **Each, $30.00**

4-370. CALORIMETER THERMOMETER, Beckmann, for use with No. 4-350 or No. 4-505 Calorimeter. This thermometer is the same as No. 4-365, but is furnished **without the U. S. B. S. Certificate.** **Each, $18.00**

4-375. CALORIMETER MOTOR, Fisher, Universal. For use with Calorimeters Nos. 4-350, 4-415 and 4-430. This motor can be operated on any 110-volt lighting circuit, either alternating or direct current.

It develops 1/30 H. P. at 6,000 r. p. m. under full load. With smaller loads, increased speeds are attainable up to 10,000 r. p. m. without load.

The speed of the motor under load may be controlled by means of the special type speed regulator, which is contained in the base, and permits of gradual increase from zero to 6,000 r. p. m.

The Fisher Calorimeter Motor consists of a cylindrical motor 3½ inches in diameter and 4¾ inches long over the bearings. The motor housing is attached to a hinged joint which makes it possible, by a thumb screw adjustment, to tilt the motor to any position from horizontal to vertical.

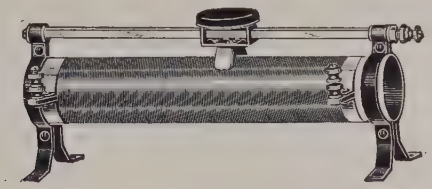
The motor is supported by means of a substantial shaft which has a hinged-joint at one end, and a swivel-joint at the other. This mounting permits a three-directional, or **universal adjustment** for the motor, and brings it on a level with the calorimeter stirrer wheel.

Motor is finished in Black Japan Enamel with nickel trimmings and furnished complete with grooved pulleys, five feet of electric cord and attachment plug, ready for attaching to lamp socket. **Each, $30.00**

4-378. CALORIMETER PELLET PRESS. For briquetting naphthalene, benzoic acid, powdered coal, etc., for use in the determination of the calorific value or molecular weight of a substance. Reference, Findlay, *Practical Physical Chemistry, 117 (1923).*

In calorimetry the substance to be burned is frequently of a powdery and sticky consistency, which makes it difficult to handle. By compressing it, either alone or along with some absorbent, into a tablet or a pellet, it may be handled very readily. By imbedding the ignition wire in the pellet, by coiling it and inserting it in the powder in the base of the press just previous to molding, the wire can be made to serve as a convenient handle for the pellet during weighing, and transference to the bomb. The compact nature of the pellet tends toward a steady, even, and complete combustion of the material from the outside to the interior, and eliminates the possibility of scattering the unburned material away from the ignition wire in the early stages of the combustion.

In the determination of the molecular weight of a substance by the boiling point or freezing point methods, it is necessary to introduce into the apparatus definite weights of the substance under examination. This must be done very rapidly, or the conditions of the experiment will vary. Fine powders must be brushed into the center of the tube through the side arm. This takes quite some time, but with the pellet, the side arm stopper can be removed, the pellet rolled down the arm into the center of the tube, and the determination continued with practically no time loss or temperature change. **Each, $30.00**



4-380

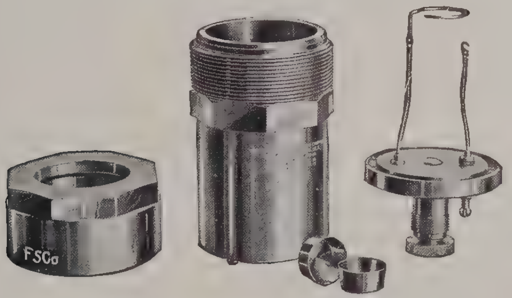
4-385

4-380. RHEOSTAT, for Calorimeter Ignition Systems. This Rheostat is substantially built of white porcelain enameled steel tubing, wound with special resistor wire of a low temperature coefficient. The desired rate of heating the ignition wire is controlled by moving the sliding contact. Suitable for use on a 110-volt circuit (either A.C. or D.C.) for operating the ignition system of Parr Calorimeters Nos. 4-350, 4-415 and 4-430, also the Emerson Calorimeter No. 4-505. Capacity 3.1 amperes, Resistance 44 Ohms.
Each, $9.00

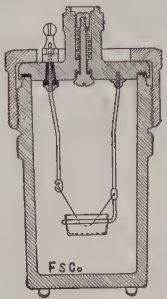
4-385. ILLIUM FUEL CAPSULES, for use with the No. 4-350 Parr Oxygen-Bomb Calorimeter. The capsule for holding the charge is at the center of the combustion in all calorimetric determinations. The high melting point of Illium and its abnormally high resistance to the corrosive action of the acids generated in the combustion, make Illium most satisfactory for capsules. Illium capsules can be recommended for use with oxygen-bomb calorimeters in general and, in particular, for the No. 4-350 Parr Oxygen-Bomb Calorimeter.

For oils, the Illium crucible (see Crucibles) of either the 10 ml. or 20 ml. capacity, is more convenient than the capsule.

This capsule is about 24 mm. diameter at the bottom and 27 mm. diameter at the top, and about 12 mm. deep.
Each, $4.00



4-390



4-390
Cross-section of
Parr Oxygen Bomb

4-390. CALORIMETER BOMB, Parr, Oxygen Type, Illium. For use with the No. 4-350 Calorimeter. The bomb is cylindrical in shape, and consists of but three parts; the top, the bottom, and the union which holds them together, the top and the bottom are made entirely of Illium. (For properties of Illium, see No. 4-350.) The top is fitted with a special spring valve which permits the rapid charging of the bomb with oxygen, without blowing the charge from the ignition capsule, and facilitates the withdrawing of the gases of combustion for analysis. Two lead wires for the ignition current are attached to the top. The one is grounded directly in the top, and serves as a support for the ignition capsule. The other passes through the top, but is insulated from it by means of a bushing, and serves as the return wire. Connection between the two is established by means of the ignition wire. Entire bomb is of simple design, and is very easily loaded and discharged. The bomb is supplied with two Illium fuel capsules.
Each, $225.00

4-395. IGNITION WIRE, for No. 4-350 Parr Oxygen-Bomb Calorimeter. This wire is of uniform diameter and composition, permitting the operator to calculate its calorific value directly from the length of wire used. The wire comes on cards 7 cm. wide, enabling this length to be cut off directly without measuring by means of a ruler, making this part of the determination a constant factor in the calculation of the calorific value of a substance. Each card holds about 75 feet of wire, sufficient for about 325 determinations. This same wire is used with the Parr Peroxide Bomb Calorimeter, No. 4-430.
Per Card $ .90
Lots of 6 Cards, 10% discount.

4-400. GASKETS, for Bomb Cover, for No. 4-350 Parr Oxygen-Bomb Calorimeter. These gaskets are all cut to fit exactly into the Bomb Cover, and can be very easily slipped into place.
Each $ .75

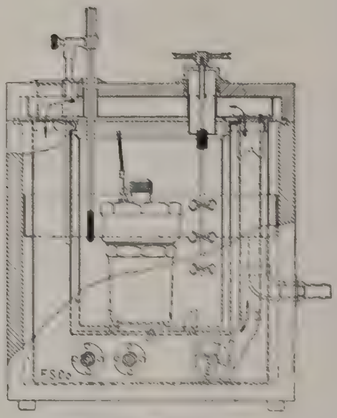
4-405. GASKETS, for Bomb Valve, for No. 4-350 Parr Oxygen-Bomb Calorimeter are cut to size and easily replaced.
Each $ .50

4-410. GASKETS, for Bomb Union, for No. 4-350 Parr Oxygen-Bomb Calorimeter. **Per doz. $ .50**

PARR OXYGEN-BOMB CALORIMETER

WITH ADIABATIC JACKET

4-415 4-420



Cross-section of
No. 4-415 Parr Oxygen
Bomb Calorimeter,
with Adiabatic Jacket

4-415. CALORIMETER, Parr, Adiabatic, Oxygen Bomb. This outfit is the same as No. 4-350, except that it has a special adiabatic jacket, instead of the regular type.

The Adiabatic Jacket surrounds the water bath, in which the bomb is immersed, and prevents loss of heat by radiation. Radiation from the top is prevented by means of an Adiabatic Cover.

A separate stirrer in this jacket provides complete circulation of the water on all sides, top and bottom.

By means of a separate thermometer inserted in the jacket, the temperature of this water is observed and made to correspond with, and follow, the temperature of the water surrounding the bomb, as indicated by the other thermometer. An overflow pipe leads off the excess water which is admitted in regulating the temperature by means of the warm and cold water supply.

The cover of this jacket is hinged, and can be raised, and then swung to the side. However, it cannot be swung until it has been raised and the thermometers removed, thus preventing breakage of the thermometers.

The outfit consists of illium bomb; adiabatic jacket and cover complete; water container; 1 oxygen tank connection, complete with valves, gauge and union; ring support for bomb cover; bomb wrench and bench socket for holding bomb; locking hinge for oxygen cylinder; 2 reading lenses for thermometers; 12 gaskets for bomb cover; 12 gaskets for bomb union; 6 illium fuel capsules, ignition wire; and directions for operation. Parr Adiabatic Calorimeter, without motor, thermometers or rheostat. **Each, $490.00**

Motor, see No. 4-375; **Thermometers,** see Nos. 4-355 and 4-425; **Rheostat,** see No. 4-380.

Separate parts for the Parr Adiabatic Calorimeter No. 4-415 are the same as those for the No. 4-350 Calorimeter, with the exception of the No. 4-420 Adiabatic Jacket and its thermometer, No. 4-425.

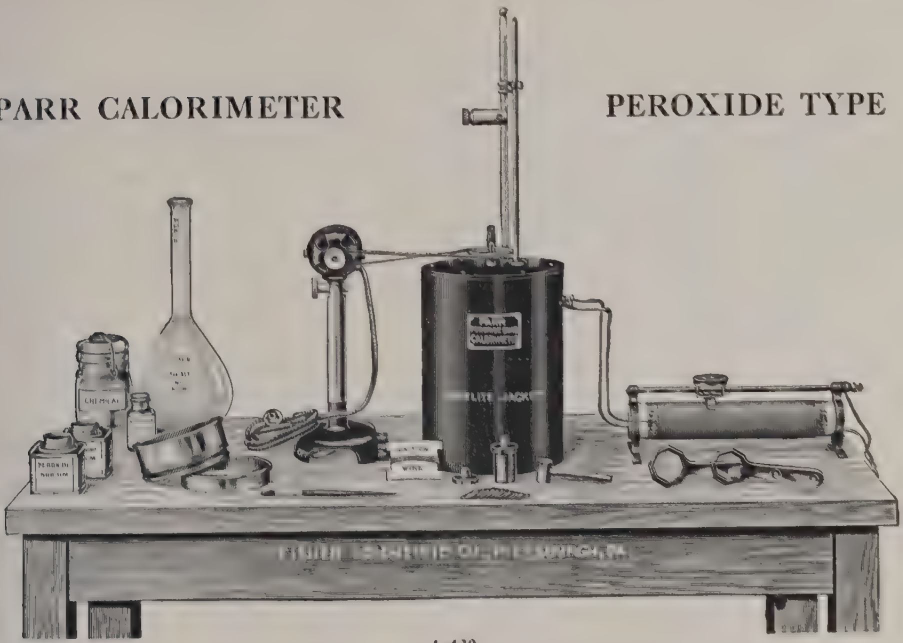
4-420. ADIABATIC CALORIMETER JACKET, for Parr Calorimeter. Consists of one adiabatic jacket and cover, one pair of idler pulleys, one pulley for pump, one pulley for stirrer, one thermometer support rod, one oval water container and stirrer.

This is the jacket supplied with the No. 4-415 Outfit, and described more fully under that number. It can be purchased separately and used with the other equipment in the No. 4-350 Outfit.

Each, $200.00

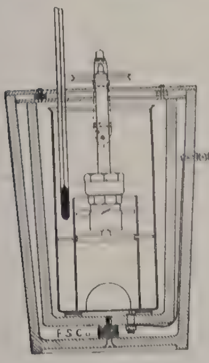
4-425. ADIABATIC JACKET THERMOMETER, certified. Used with No. 4-415 Calorimeter and No. 4-420 Jacket. This thermometer is inserted in the water jacket and used to note the temperature so that the warm and cold waters can be introduced at the desired rate. The range of this thermometer is 65 to 90° F., subdivided in 1/20° divisions. Supplied with U. S. Bureau of Standards certificate. **Each, $12.00**

PARR CALORIMETER PEROXIDE TYPE



4-430

4-430. CALORIMETER, Parr, Peroxide Type, Bakelite Jacket. This calorimeter may be used wherever the Oxygen-Bomb Type can be used, but is particularly recommended for use in the determination of carbon and sulphur in conjunction with the calorific determination, as described in *Gas Chemists' Handbook*—American Gas Association, XXIII (1922), also Chemical and Metallurgical Engineering, Vol. 24, p. 19 (1921).



Cross-section of No. 4-430 Calorimeter

This type of calorimeter does not use oxygen gas as is customary, but derives the necessary oxygen from the decomposition of Sodium Peroxide with which the sample to be tested is intimately mixed.

The Carbon is burned to carbon dioxide, which unites with the sodium hydroxide formed in the reaction, and forms sodium carbonate. This is then analyzed for its carbon dioxide content in the Total Carbon Apparatus No. 4-475.

The Sulphur in the coal or other compound under investigation, is oxidized to sulphuric acid, which unites with the sodium hydroxide also formed, forming sodium sulphate which is then analyzed for sulphur content by means of the Sulphur Photometer No. 4-480.

Bomb. The bomb consists of an alkali-resisting lining and cover, a false bottom, a bomb jacket and a union for holding the entire bomb together. As the reaction is carried on in the separate removable lining, the inconvenience experienced in cleaning the oxygen bomb is eliminated. The lining is a fusion cup which can be readily removed from the bomb jacket, placed in a beaker, and the charge dissolved without loss. The extra lining supplied with each bomb, enables a second charge to be made up while the first is dissolving. This bomb is illustrated separately under No. 4-435.

The **bomb cover** is removable, and may be substituted by a false cap, in which case the bomb can be used for the direct determination of total carbon and sulphur without determining the calorific value.

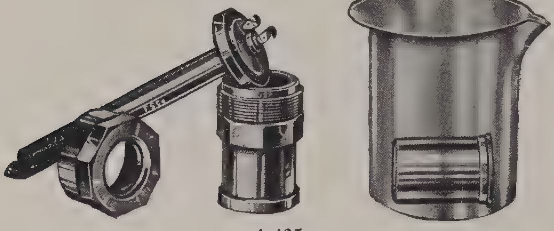
Ignition of charge is effected by means of an electrically heated ignition wire similar to that used in the Oxygen-Bomb outfit No. 4-350.

Circulation of the water surrounding the bomb, is effected by revolving the bomb by means of a belt and pulley. Fins clamped to the body of the bomb, and a nickeled water deflector, effect thorough mixing. The Jacket and Cover are made of Bakelite, the same as the No. 4-350 Jacket.

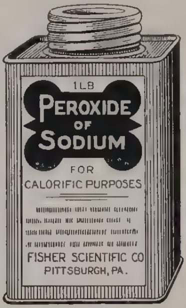
Apparatus supplied under this number, includes one bomb complete, Bakelite jacket, one nickeled can, one extra fusion cup, two false caps, gaskets and wrenches, one two-liter measuring flask, thermometer graduated 65-90° F. in 1/20° with Bureau of Standards Certificate, thermometer support, stirring fins, measuring cup, 100 mesh brass frame sieve with receiver, chemicals sufficient for 50 determinations, chemical jar, ignition wire, pincers, reading lens for thermometer, brush, and complete directions for use of calorimeter. Without Motor or Rheostat for ignition. **$100.00**

Motor, for use with No. 4-430 Calorimeter, is listed under No. 4-375. **Rheostat,** for use with No. 4-430 Calorimeter, is listed under No. 4-380.

Calorimeter Accessories



4-435
See also No. 4-440



4-450

4-455

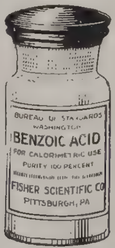
4-435. CALORIMETER BOMB, Peroxide Type, used with No. 4-430 Calorimeter. Consists of the bomb proper, floating bottom, cover with stem, union and one fusion cup which fits neatly inside the bomb and serves as a lining. The illustration shows the bomb dismantled and the method of dissolving the fusion.
Each, $22.75

4-440. CALORIMETER FUSION CUP, for the No. 4-430 Parr Peroxide Calorimeter. This cup is made of a special alkali-resisting metal, and fits inside of the bomb and serves as a lining for the bomb. An extra cup is recommended so that a second charge can be weighed up while the first is being burned, thus saving much time when many determinations are to be run successively. This cup is shown in illustration No. 4-435; it is the piece in the beaker. **Each, $6.50**

4-445. GASKETS, for Bomb for No. 4-435, of rubber.......................................**Per dozen, $ .50**

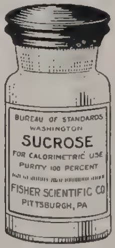
4-450. SODIUM PEROXIDE, for Calorimeter. Prepared especially for use in No. 4-430 Calorimeter. This peroxide is absolutely free from Sulphur and Carbonates. This eliminates all necessity for running "blank determinations" on the auxiliary ingredients used in making up the charge. It is supplied in hermetically sealed containers holding ¼ and 1 lb. each. **Per ¼ lb. can, $ .95**
Per 1 lb. can, $2.25

4-455. ACCELERATOR. For use in No. 4-430 Calorimeter. This accelerator is used as a priming agent in the analysis of substances like asphaltic oils, rubber, etc., which are rather difficult to ignite. It is of the highest quality obtainable. It is put up in bottles containing 3½ ounces, which is sufficient accelerator for about 400 ordinary determinations. **Per bottle, $ .75**



4-460

4-465



4-470

CALORIMETER STANDARDS

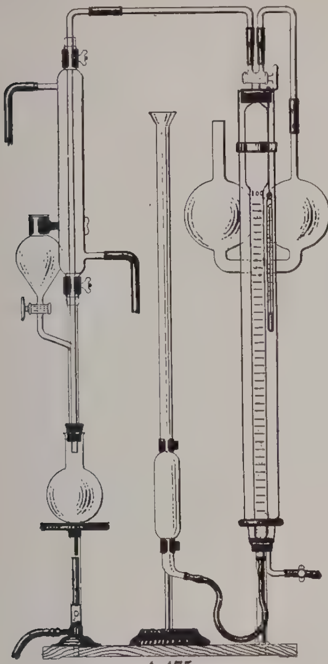
In the determination of the calorific value of substances, a certain amount of the heat generated is absorbed by the apparatus itself, and is equivalent to heating an additional amount of water. The quantity of heat so absorbed, expressed in calories or B.T.U., is known as the "Water Equivalent" of the apparatus. This can be calculated, or more readily determined experimentally, by burning a substance of known calorific value, and measuring the quantity of heat actually absorbed by the water. The difference between the total quantity of heat theoretically generated and that actually determined by calculation from thermometer readings, weight of water, charge, etc., gives the quantity of heat absorbed by the apparatus or its "Water Equivalent." When the "Water Equivalent" is once determined, it is applied as a correction factor for all calorific determinations. It need only be checked from time to time, but should be re-established whenever changes are made in the apparatus.

The following Calorimeter Standards are offered for the determination of the "Water Equivalent" of Calorimeters. In each case the standard has been specially prepared, its calorific value has been determined by the U. S. Bureau of Standards, and this value is given for each bottle.

4-460. CALORIMETER STANDARD, Benzoic Acid. Prepared by the U. S. Bureau of Standards, and supplied with U. S. Bureau of Standards Certificate. **Per Bottle of 30 grams, $2.50**

4-465. CALORIMETER STANDARD, Naphthalene. Prepared by the U. S. Bureau of Standards, and supplied with U. S. Bureau of Standards Certificate. **Per Bottle of 50 grams, $2.50**

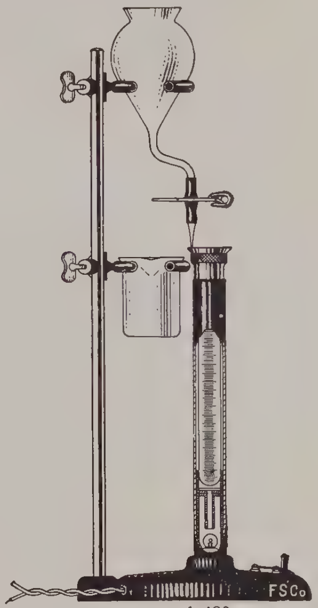
4-470. CALORIMETER STANDARD, Sucrose. Prepared by the U. S. Bureau of Standards, and supplied with U. S. Bureau of Standards Certificate. **Per Bottle of 60 grams, $2.50**



4-475

TOTAL CARBON
AND
SULPHUR
APPARATUS
used with
PARR PEROXIDE
CALORIMETER

4-500



4-480

4-475. TOTAL CARBON APPARATUS. For determining the total carbon content of coal, coke, organic compounds, etc., by the sodium peroxide fusion method, in which all the carbon contained in the material has been oxidized and recombined to form sodium carbonate. This is done incidentally in the determination of calorific value with Calorimeter No. 4-430. Reference, S. W. Parr, *Journal American Chemical Society*, XXI, 237 (1909).

By liberating the carbon dioxide from this sodium carbonate, by treatment with acid, under conditions specified as to temperature and pressure, and measuring the total quantity evolved from a weighed sample, the carbon content can be easily calculated. This represents the total carbon present in the original sample.

Apparatus consists of a gas evolution flask of glass, acid funnel, reflux condenser, jacketed burette with bulb to hold 100 ml., and narrow portion graduated to 100 ml. in ⅕ ml. and numbered every 2 ml.; a three-way stopcock; an absorption bulb; a leveling tube on stand, also a thermometer enabling measurements to be made under known conditions of temperature and pressure. Supplied with stand, rubber tubing connections, Bunsen burner and directions for use. **Total Carbon Apparatus,** complete, **$52.00**

4-480. PHOTOMETER, SULPHUR, PARR, Improved Type, for use in conjunction with the No. 4-430 Parr Peroxide Calorimeter, for determining the sulphur content of coal, oil, food, etc. The ordinary gravimetric method of determining sulphur takes several hours, but by using this photometer the time can be cut to about sixty minutes, and the accuracy of this method is still within ⅕ of 1 percent of that of the gravimetric method.

The **Method** consists simply of dissolving the peroxide fusion, slightly acidifying, diluting to a definite volume, and adding a Barium Salt to complete precipitation. The turbid solution is then gradually run into the photometer until the light disappears, and the depth of solution noted. The calibrated scale on the photometer gives the percentage of sulphur directly, thus eliminating all calculations.

The **Photometer** consists of source of light and a photometric column mounted on a stand, with a beaker and drip funnel supported on a rod attached to the stand.

The **Light** is supplied by a 3-volt tungsten lamp, with clear glass bulb, receiving its current from two dry cells or their equivalent.

The **Photometric column** consists of a dark platform with a hole in it for the admission of a definite quantity of light, a water cup, located just below the graduated tube, which serves as an immersion cell for its lower end, and the graduated tube. This tube is made of clear glass, and is calibrated so that the depth of liquid at which the light disappears, corresponds to the percentage of sulphur in the substance.

The **Funnel** serves as a reservoir for holding the turbid solution while determining the sulphur content.

The **Beaker** serves as a catch-all for any drops of the strongly acid liquid falling from the funnel end when not over the photometric column. **Photometer, without Battery, Each, $25.00**

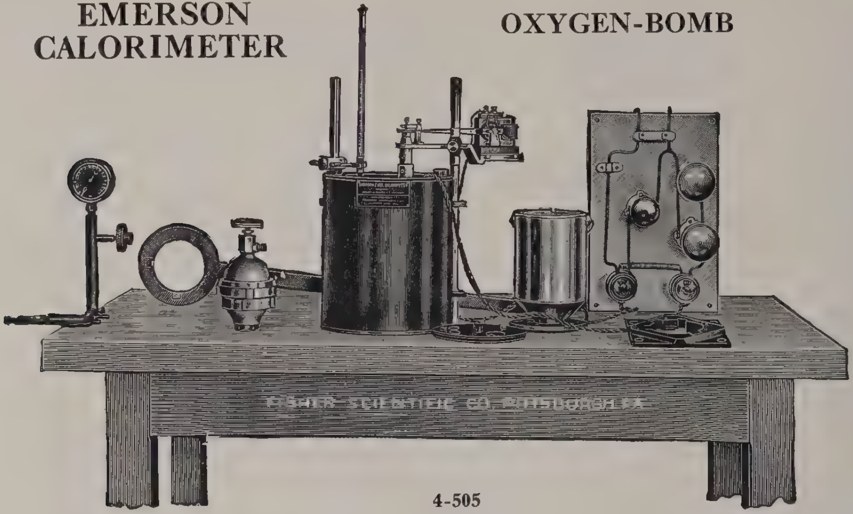
4-485. BATTERY of 2 Burgess Dry Cells for use with No. 4-480 Photometer.................... **Each, $1.00**

4-490. EXTRA INCANDESCENT LAMP. For No. 4-480 Photometer. Used to replace the lamp supplied with the outfit in case it should burn out. **Each, $ .75**

4-495. PHOTOMETER TUBE, of glass, graduated for use in Parr Sulphur Photometer, No. 4-480. Length of tube 200 mm. **Each, $3.50**

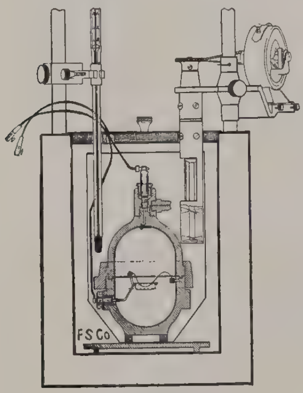
4-500. BARIUM SALT, Special, for precipitating sulphur. Prepared for use with Parr Sulphur Photometer, No. 4-480; supplied in 2 oz. bottle. **Per bottle, $ .75**

EMERSON CALORIMETER OXYGEN-BOMB



4-505

4-505. CALORIMETER, Emerson, Oxygen Bomb, Single Valve. The most used style of Emerson Calorimeter, for determining the calorific value of solids or liquids, by the Oxygen-Bomb Method; outlined under No. 1 in the introduction to calorimeters.



4-505
Cross-section of Emerson Calorimeter

Bomb is made of a special steel; 400 ml. capacity, and has a nickel lining. The upper and lower parts of the bomb have a tongue-and-groove joint on the contact surfaces, and are held together by a heavy union. The charge is ignited by an electrically heated wire, controlled through a lamp bank.

Jacket. New form, consisting of a heavy walled glass jar surrounded by a thick layer of felt and a copper sheath, all mounted on a cast iron base.

Auxiliary Apparatus. Consists of a high pressure gauge; stirrer with motor for use with 110-volt current in series with a 60-watt lamp; nickel combustion pan; ignition wire; gaskets; thermometer holder; thermometer reading lens; piping to fit a Linde oxygen tank; 3-ft. spanner wrench; a cast iron holder for the bomb, and directions for use.

The illustration shows a convenient lamp bank, which is not supplied with the outfit. This can be connected up in the laboratory; it consists of a 60-watt lamp in series with the motor and two 100-watt lamps in parallel, placed in series with the ignition wire. A simple method for wiring is to screw a 60-watt lamp on the wall of the laboratory for use with the motor; current for the ignition is obtained by stepping down the 110-volt circuit by means of Rheostat No. 4-380.

Outfit, without thermometer, lamp bank or oxygen tank, **$245.00**

THERMOMETER for Emerson Calorimeter, see Nos. 4-515, 4-520, 4-365 and 4-370. **OXYGEN** for calorimeters, see Gases.

RHEOSTAT for ignition system, see No. 4-380.

4-510. CALORIMETER, Emerson, Single Valve, with gold rolled copper lining. The same outfit as described under No. 4-505 except that the nickel lining for the bomb is replaced by a gold rolled copper lining. This type is recommended for more exacting work.

With jacket and auxiliary apparatus as described under No. 4-505 and directions for using. **$328.00**

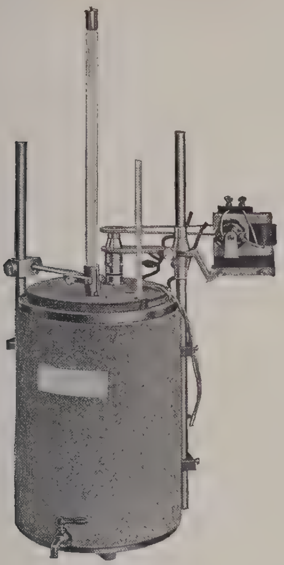
Note: *The Emerson Calorimeter can be supplied with a platinum lined bomb at a price corresponding with the market price of platinum.*

4-515. CALORIMETER THERMOMETER, Certified, Etched Stem, for No. 4-505 Emerson Calorimeter. These thermometers are made of well seasoned, white-enamel background, hard glass tubing, are nitrogen filled, have expansion chamber and ring at top for hanging when not in use. Mercury reservoir is made over 2 inches long, so as to insure great sensitivity and quick action. Overall length is 24 inches, range 18 to 30° C. divided in $^{1}/_{50}$°, and accurate to $^{1}/_{100}$°. Each thermometer has the graduations and serial number etched on the stem. These thermometers have all been **tested by the U. S. Bureau of Standards and are furnished with the Bureau's Certificate of Accuracy.** **Each, $30.00**

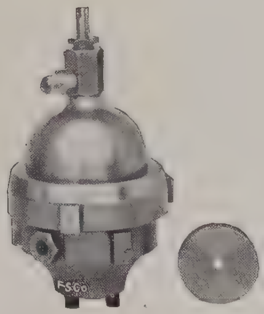
4-520. CALORIMETER THERMOMETER for No. 4-505 Emerson Calorimeter. The same as No. 4-515, but **without** the U. S. Bureau of Standards Certificate of Accuracy. **Each, $20.00**

BECKMANN THERMOMETERS for use with Emerson Calorimeters, see Nos. 4-365 and 4-370.

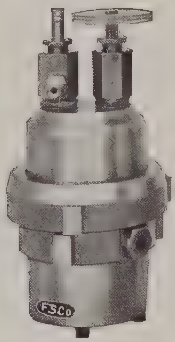
EMERSON CALORIMETER
WITH DANIELS ADIABATIC JACKET



4-523

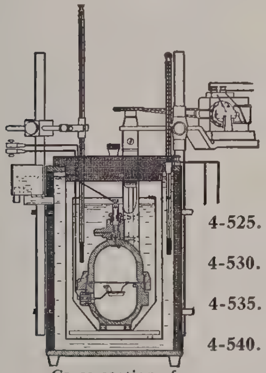


4-525 to 4-535 incl.



4-570
See also No. 4-565

4-523. CALORIMETER, Emerson, Adiabatic, Single-Valve Bomb. This outfit is similar to No. 4-505 except that it is equipped with a Daniels Adiabatic Jacket.



Cross-section of No. 4-523

Daniels Adiabatic Jacket. The greatest source of error in calorific determinations is due to the loss of heat through radiation.

To obviate this, the radiation has been reduced to a minimum by keeping the surrounding medium at the same temperature as the bomb itself.

In the Daniels Adiabatic Jacket, the bomb is immersed in a water bath, in the usual manner. This bath is surrounded by an air space and a water container, the temperature of which is increased, as the bomb heats, by passing an electric current through the water in this container.

Calorimeter, supplied with single-valve bomb, with nickel lining; with the auxiliary apparatus as described in No. 4–505, but with the Daniels Adiabatic Jacket. **Each, $275.00**

4-525. SINGLE VALVE BOMB, fitted with nickel lining, for use with Emerson Oxygen Bomb Calorimeters No. 4-505 and No. 4-523. **Each, $105.00**

4-530. SINGLE VALVE BOMB, fitted with gold rolled lining, for use with Emerson Oxygen Bomb Calorimeters No. 4-505 and No. 4-523. **Each, $188.00**

4-535. SINGLE VALVE BOMB, fitted with platinum lining, for use with Emerson Oxygen Bomb Calorimeters No. 4-505 and No. 4-523. **Prices on request.**

4-540. NICKEL LINING for Bomb, for No. 4-525 Bomb for use with Emerson Oxygen Bomb Calorimeters No. 4-505 and No. 4-523. **Each, $12.00**

4-545. GOLD ROLLED COPPER LINING for No. 4-530 Bomb for use with Emerson Oxygen Bomb Calorimeters No. 4-505 and No. 4-523. **Each, $95.00**

4-550. PLATINUM LINING for Bomb for No. 4-505 Calorimeter. The remarkable resistance of platinum to the corrosive action of nitric and sulphuric acids, makes it the ideal lining for calorimeter bombs. It is, therefore, recommended for use in determinations requiring the greatest degree of accuracy.
Prices vary according to the market price of platinum.

4-555. NICKEL FUEL PAN for use with any of the Emerson Bombs.............................. **Each, $ .75**

4-560. IGNITION WIRE. This is specially prepared for use with calorimeter No. 4-505. It will heat up very uniformly and not burn out in spots the way ordinary iron wire will. It is of homogeneous composition, and has a uniform calorific value. This permits the "correction factor for the ignition wire" to be calculated directly from its weight, and eliminates the need for determining this factor experimentally. Wire is supplied on spools holding 200 feet, enough for 600 determinations. **Per spool, $ .90**

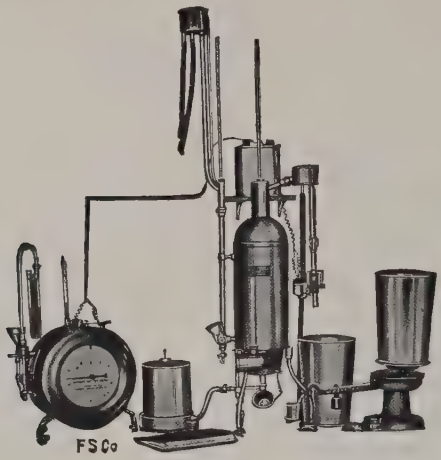
4-565. CALORIMETER, Emerson, Double-Valve Type. This outfit is similar to the No. 4-505 Calorimeter, but has a Bomb fitted with two valves. In addition to doing all that the No. 4-505 outfit will do, the double-valve calorimeter offers opportunity for analyzing the products of combustion which are formed during the test. It is particularly well suited for the determination of the carbon content of steel by burning the sample in the same manner as a fuel, and subsequently analyzing the gases exhausted from the bomb. The double-valve Bomb is illustrated separately under No. 4-570.

NOTE: The double-valve Bomb cannot be used with the No. 4-505 Outfit.

Calorimeter supplied with the same auxiliary apparatus as the No. 4-505 Calorimeter, but supplied with a nickel-lined, double-valve Bomb. **Each, $255.00**

4-570. CALORIMETER BOMB, Double-Valve Type, fitted with a **gold rolled copper lining.** This bomb is similar in design to the nickel-lined bomb supplied with the No. 4-565 Outfit. **Bomb only, $218.00**

NOTE: If desired, the No. 4-565 Calorimeter Outfit will be supplied with the No. 4-570 gold-lined bomb instead of the nickel-lined bomb. **Price, $353.00**



4-585

AUTOMATIC GAS CALORIMETER

4-585. **CALORIMETER, Gas, Sargent Automatic, Junker Type.** Designed by C. E. Sargent, a well-known gas engineer, adopted by the U. S. Bureau of Standards and The American Gas Institute as a Standard Test Instrument. In this type of calorimeter a unit volume of gas is caused to burn. The heat generated is absorbed in a weighed quantity of water of known temperature, flowing through a jacket surrounding the combustion chamber. For method of use, see American Gas Association, *Gas Chemists' Handbook, 208 (1922)*. Apparatus consists of four main parts—gas meter, pressure regulator, calorimeter with water tipping device, and scale.

Gas Meter. Wet Test, Precision Type, calibrated to read 0.1 cu. ft. per revolution in 0.001 cu. ft. divisions, with integrating mechanism to read to 100 cu. ft. before repeating. This calibration facilitates direct calculation in terms of B.T.U. Drum is made of cold rolled brass, which is tinned to protect from corrosion by water or gas, and is accurately balanced on knife edges so that it rotates under 0.1 inch water pressure. Meter is fitted with thermometer (range 40 to 110° F. in 1° divisions) in the exit line; two permanent spirit levels; three legs, two of which are fitted with leveling screws; filling funnel; outlet cock; drain plug; water gauge; glass syphon pressure gauge, and electric switch for closing circuit to water tipping apparatus. *(See large illustration No. 4-605 on page 139.)*

Gas Pressure Regulator. This regulator is built on the ordinary gasometer principle; a float tank moves up and down within a larger stationary tank, the gas being retained by means of a water seal. When the pressure within the system increases or decreases, the float tank rises or falls accordingly. The regulator is made entirely of copper and brass, and is lacquered to render it corrosion proof.

Calorimeter Body. The calorimeter body has been designed to permit of ready access to all parts. The outer jacket and the weirs are easily taken off by simply removing a few screws, thus exposing the inner tubes, which can be thoroughly cleaned (by brushes provided) thereby maintaining a high and uniform heat transfer between the burning gas and the water.

Constant-Level Water Reservoir and **Automatic Tipping Device.** The rate of flow of water through the jacket is maintained constant by means of a constant-level water reservoir, and a cock in the line leading to the jacket. The heated water is automatically switched from one bucket to the other by means of the mechanical tipping device attached to the body of the calorimeter, and operated by means of dry batteries and an electro magnet controlled by the contact established in the meter every time 0.1 cu. ft. of gas has been passed.

Weighing Buckets. The weighing buckets are balanced to facilitate weighing one batch of water in one bucket, while the other bucket is being filled.

Thermometers. Two thermometers 18 inches long are supplied, for measuring the temperature of the inlet and outlet water. The Fahrenheit scale is used so that all calculations may be made directly in British Thermal Units. The Thermometers have a range of 30 to 110° F., are graduated in $^1/_{10}$ degrees, calibrated for total immersion, and made according to specifications of the American Gas Institute. Reading lenses for the thermometers permit readings to .01° F. to be readily made. **An Exhaust Gas Thermometer,** range 40 to 110° F. in 1° divisions, completes the temperature-indicating equipment.

Scale. The quantity of water heated by each 0.1 cu. ft. of gas is weighed on a 10 lb. scale accurate to 0.01 lb.

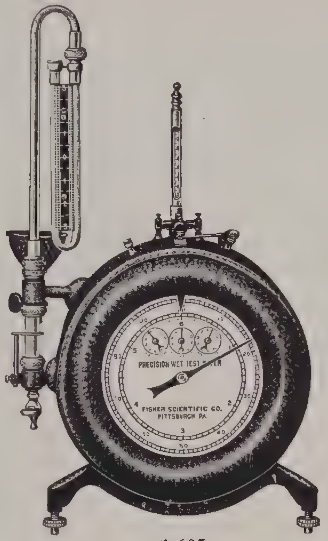
Entire apparatus has been designed for convenience in use, cleaning and setting up, particularly where gases of widely varying characteristics are to be analyzed for calorific value.

The complete apparatus supplied under No. 4-585, consists of calorimeter proper with automatic attachment; Bunsen burner and mirror; 2 precision thermometers; exit gas thermometer; reading lenses; gas meter complete with attachments; gas pressure regulator; 10-lb. scale; 2 balanced weighing buckets; 12-ft. rubber tubing for water connections; 3 lengths metallic tubing for gas connections; 2 dry batteries in nickeled case; 2 special brushes for cleaning calorimeter; record cards and set of directions for operating.

Price, $295.00

SEPARATE PARTS FOR SARGENT GAS CALORIMETER

(Illustrated and described more fully under No. 4-585.)



4-605

4-590. CALORIMETER BODY, with all the improved features; with Bunsen burner, beaker and mirror. **Each, $150.00**

4-595. CALORIMETER THERMOMETER. American Gas Institute specifications, range 30 to 110° F., subdivided in $^1/_{10}$° divisions, calibrated for total immersion. Two of these thermometers are used, one for the inlet water and one for the outlet water. **Each, $9.50**

4-600. CALORIMETER THERMOMETER, U. S. B. S. Certified. Similar to No. 4-595, but tested by the United States Bureau of Standards and supplied with their certificate of accuracy. **Each, $20.00**

4-605. CALORIMETER GAS METER, Wet Test, Precision Type. Designed and built for the precise measuring of gas in connection with laboratory determination, such as moisture, dust, tar, calorific value, volume, flow, etc. The inside reservoir and the revolving drum are made of brass, heavily tinned where in contact with the water or the gas.

The indicator makes a complete revolution for each 1/10 cubic foot, and is graduated in 100 divisions, so that **each division represents 1/1000 of a cubic foot.** There are three small dials which record 1 cubic foot, 10 cubic feet and 100 cubic feet, respectively. The workmanship is so precise that the drum will revolve and make accurate measurements of gas at 1/10 of one inch pressure.

ALL CONDITIONS CONTROLLED

The meter has the equipment necessary to control all of the operating conditions, so that standard measurements can be made and duplicated.

Leveling—There are two spirit levels on the top and two leveling feet at the front and a stationary foot at the rear.

Water—The gauge glass with an improved marker (recommended by the **U. S. Bureau of Standards**) make it possible to keep the amount of water in the meter at the proper level for standard operating conditions.

Temperature—An armored thermometer is inserted in the gas outlet, so that the temperature can be noted and corresponding correction made.

Pressure—A manometer shows the pressure in the meter so that measurements can be made at, or reduced to, standard conditions.

Flow—The rate of flow of gas through the meter can be noted accurately by connecting the electrical contact provided with a bell or similar device, which will signal the passage of each 1/10 cubic foot. If desired, the signaling can be eliminated by opening the switch and withdrawing the contact by means of the screw on the top of the meter. In calorific tests this signaling device can be connected to an automatic tipping device for changing the flow of water from one bucket to another.

The meter has a black, instrument finish and the fittings are nickel plated. **Each, $85.00**

4-610. METER THERMOMETER. Range 40 to 110° F., subdivided in 1° divisions; in armored case. **Each, $ 6.00**

4-615. EXHAUST GAS THERMOMETER. Range 40 to 110° F., subdivided in 1° divisions.... **Each, $ 2.50**

4-620. GAS PRESSURE REGULATOR, supplied with weights .... **Each, $20.00**

4-625. SCALE. For weighing water; 10 lb. capacity, weighs to $^1/_{100}$ lb.; supplied with weights .... **Each, $20.00**

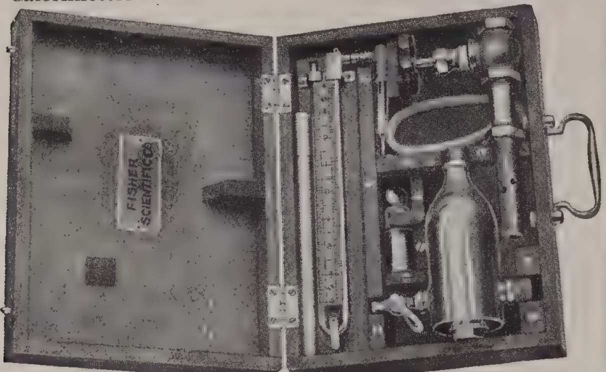
4-630. WEIGHING PAILS, nickeled, counterpoised and supplied in pairs.................. **Per pair, $6.50**

4-635. BATTERIES, Dry, Burgess, for use with No. 4-585 .... **Each, $ .50**

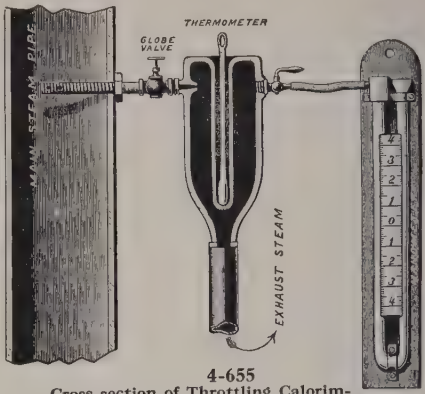
4-640. SPECIAL CABINET. Recommended by the American Gas Institute, made of quartered oak, dust tight, especially for the No. 4-585 Gas Calorimeter Outfit. Supplied with suitable tanks, pump and fittings for permanent installation. Supplied only when ordered separately under this number....... **Each, $125.00**

4-645. BOOK of "Tables of Standard Reduction Factors for Gases"......................... **Each, $1.75**

4-650. B. T. U. RECORDS, U. S. Bureau of Standards design.......................... **Per Pkg. of 50, $ .50**



4-655



4-655
Cross-section of Throttling Calorimeter showing method of connection

4-655. CALORIMETER, Steam, Carpenter, Throttling. For determining the quantity of moisture in saturated steam.

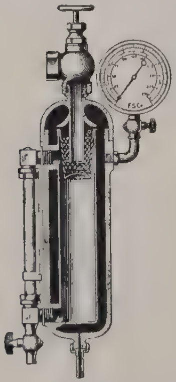
This Calorimeter is based on the principle, that when the pressure on a high-pressure saturated steam line is lowered, some of the heat contained in the steam is liberated and may be utilized in evaporating any water contained in the steam, and in raising the temperature above that due solely to its pressure—or in other words—superheat it. By measuring the degree of this superheat and referring to standard steam tables, the quantity of moisture in the steam may be determined. Reference, Kent, *Mechanical Engineers' Handbook, 1017 (1923)*.

The Calorimeter consists essentially of a vessel about 3 inches in diameter, to which steam is supplied through a tapering orifice, and which contains at its center a deep thermometer well. A mercury pressure gauge is supplied to indicate operating pressures.

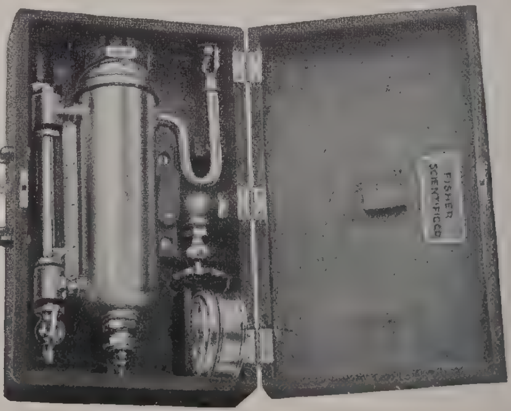
Apparatus is supplied complete with calorimeter, valve, cock, 400° F. thermometer, gauge, mercury, and mercury-filler for gauge, and collecting tube; all packed in hardwood carrying case.

Supplied with standard size collecting tube, 6x½ inch unless otherwise specified. **Each, $75.00**

NOTE: Throttling Calorimeters are limited by the quantity of heat contained in the steam, and are, therefore, not recommended on lines where the moisture is likely to run above the range of from 3.5% at 80 lbs. absolute pressure to 7% at 250 lbs. absolute pressure. This is, of course, well within the range met in actual practice.



4-660
Cross-section of Separating Calorimeter



4-660

4-660. CALORIMETER, Steam, Carpenter, Separating. For determining the percentage of water in steam by mechanically separating it.

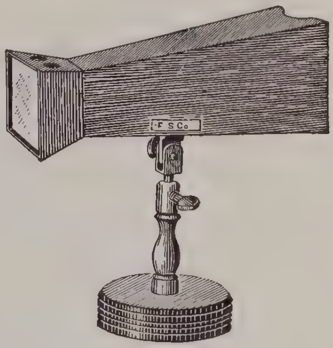
This Calorimeter consists essentially of two concentric vessels. The wet steam from the line enters the inner vessel through a valve, the water being thrown downward into the bottom of the inner vessel, while the dry steam rises, passing through the meshes of the cup at the top where any residual water is separated. The steam then passes downward through the annular space between the vessels, acting as a steam jacket to the inner vessel, and passes thence through a nozzle to the atmosphere. This cuts down all radiation, and permits the steam and water to be in equilibrium at the temperature of the incoming steam. The pressure in the outer chamber, and the flow of steam per unit of time, is indicated on engraved scales on the attached gauge. A gauge glass, and scale calibrated in pounds of water, indicate the quantity of water separated, from which data, and the indicated flow and pressure of incoming steam, the quantity of water in the steam can be calculated.

Carpenter Separating Calorimeter, complete with 3-inch test gauge, ½ inch globe valve and collecting nipple, in hardwood carrying case. **Each, $120.00**

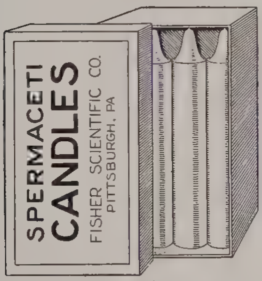
4-663. CAMERA, Color Comparator, Adjustable; used in the Colorimetric Method for the Estimation of Carbon and Manganese in iron and steel analysis. This camera will be found very convenient to support the color comparison tubes and to produce the correct daylight effect when comparing colors. Either the Eggertz straight tubes or the Julian tubes, with bent ends, can be used with this camera. (*See Color Comparison Tubes.*)

The color comparison tubes are placed in the comparator through the small holes in the top. They are viewed against a background of two removable glass plates, placed together, one of ground glass to diffuse the light and the other of cobalt blue glass to absorb the yellow rays and produce the daylight effect. The camera is painted flat black on the inside to prevent reflections. The eye end is shaped to fit the face, so that most of the extraneous light is eliminated, when making observations.

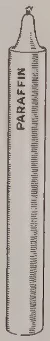
The camera is made of hardwood, mahogany finish, and stands on a substantial wooden base, 7 inches diameter. It measures about 18 inches long and stands 20 inches high at its lowest adjustment. The upright pillar has a 5-inch adjustment for height and also a device for tilting the camera, both of which are controlled by wooden thumbscrews. Supplied without color comparison tubes. **Each, $18.00**



4-663



4-665



4-670

4-675

4-665. CANDLES, Standard, Spermaceti. Length 5½ inches; used with photometers, turbidimeters and other instruments where a source of illumination of standard and reproducible intensity is required.

These candles are made from beeswax and spermaceti, according to specifications which prescribe their burning within the limits of 114 and 126 grains per hour. They are used throughout the country as the recognized standard of illumination.

Supplied in one-pound cartons containing twelve candles. **Per Carton, $3.15**

4-670. CANDLES, Paraffin. Length 7 inches; used in blowpipe analysis and for general use in the laboratory, where a small amount of light or heat is desired. **Per dozen, $ .55**
Per gross, 15% discount.

CAPS, Bottle. See Bottle Caps, for Reagent Bottles.

CAPS, Burette. See Burette Accessories.

CAPSULES. See Crucibles.

4-675. CARBONS, Cored, for use with arc-lamps. The material in center is softer, and this type of carbon gives the most satisfactory results.

Diameter, inches	¼	5/16	⅜
Length, inches	6	6	6
Per dozen	**$ .80**	**.90**	**1.00**

Per gross, 15% discount.

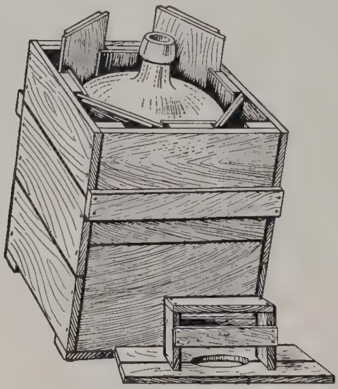
CARBON COMPARISON TUBES. See Colorimetric Apparatus.

CARBON DETERMINATION APPARATUS, for iron and steel. See Combustion Apparatus.

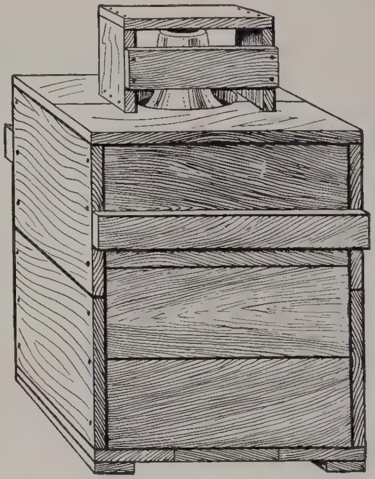
CARBON DETERMINATION APPARATUS, for coal. See Calorimeter Section.

CARBON FILTER TUBES. See Crucible Holders.

CARBONIC ACID (CO_2) APPARATUS. See Alkalimeters.



Top of No. 4-680 removed to show the new "wooden packing"

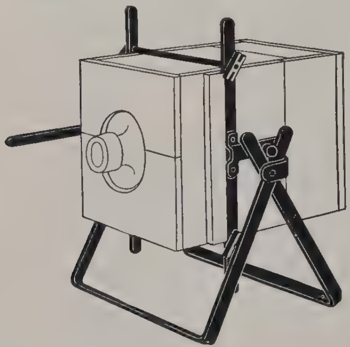


4-680

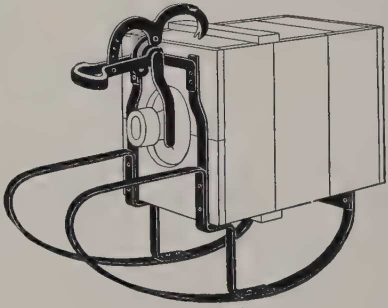
4-680. CARBOYS, Boxed, of heavy glass. With the new, improved "wooden packing," which supersedes the old fashioned hay packing and complies with the Interstate Commerce Commission's specifications for shipments of inflammable or dangerous liquids, except where mineral wool packing is necessary. By removing the collar, which acts as a top cover for the box, the bottle, as well as the wooden packing, may be taken out with little effort. A wooden hood protects the neck of the carboy in shipment.

Both the 5 gal. and the 12 gal. carboys are packed in a similar manner. The illustration on the left shows the carboy with the top of the box removed and the method of inserting the four corner-boards.

Capacity, gallons	5	12
Weight complete, pounds	40	73
Each	**$4.25**	**10.00**



4-685



4-690

4-685. CARBOY INCLINATOR, with Carrying Handles. This is a simple device, easily attached to the box of the carboy, to facilitate lifting and carrying carboys of acid, etc., and for emptying them entirely of their contents, without spilling or splashing. When released, the inclinator automatically resumes an upright position, whether the carboy is full or empty.

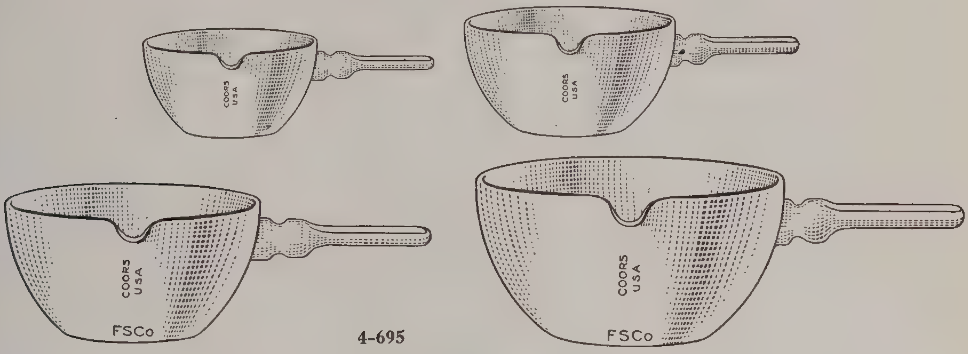
All parts are made of black enameled iron. The support is very strong and stable. The carrying bars fit under the side cleats of the carboy box and extend beyond to allow room to grip the handles firmly. Two long screw bolts, which are adjustable for either 10 or 12 gallon carboys, hold the carrying bars in position by means of four notched nuts. The tilting rod fits on either side of the inclinator and is long enough to provide good leverage, so that the carboy can be tilted easily. The tilting rod is also used as a wrench to tighten the notched nuts on the screw bolts. When not in use, the inclinator can be folded together and stored in a very small space. Supplied without carboy. **Each, $9.50**

4-690. CARBOY INCLINATOR, Rocker Type; for pouring acids and other liquids from carboys. The rockers are attached to the box of the carboy, without lifting it off the ground, and form the support on which the carboy rests when tilted.

The inclinator is built of iron and painted black. The cast parts are malleable. It can be clamped on or taken off, like a skate. A single movement of the locking lever fastens the inclinator to the carboy. A pull of the handle tilts the carboy and the contents are easily emptied with little exertion. When the handle is released, on account of the curve of the rockers, the carboy resumes an upright position. This inclinator will take either 10 or 12 gallon carboys. Supplied without carboy. **Each, $10.00**

CARBOY PUMPS. See Acid Pumps.

CASSEROLES



4-695

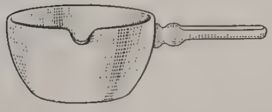
WE ARE DISTRIBUTING AGENTS
for
COORS—U. S. A. CHEMICAL PORCELAIN

ALL SIZES listed are carried in stock and shipped along with other laboratory supplies.
OUR PRICES are the same as the factory prices but we do not charge for boxes or packing.
OUR DISCOUNTS apply to the Total List Prices of ALL COORS PORCELAIN on your order, including Casseroles, Crucibles, Dishes, etc.

Lots of $ 500.00 List Prices	**10% Discount**
Lots of 750.00 List Prices	**15% Discount**
Lots of 1000.00 List Prices	**20% Discount**

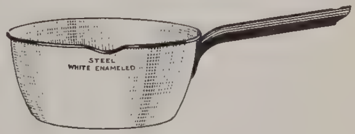
4-695. CASSEROLES, Coors Porcelain. With flat bottom and flat porcelain handle; glazed inside and outside except the rim.

*Size No.	1	2	3	3A	4	4A	5	6	7
Capacity, ml	30	75	150	210	375	500	750	1250	2000
Diameter, mm	50	70	85	95	110	133	140	165	175
Each	**$ .35**	**.38**	**.45**	**.55**	**.70**	**.85**	**1.20**	**1.55**	**2.50**



4-700

4-705



4-710

4-700. CASSEROLES, Imported Porcelain. With flat bottom and flat porcelain handle; glazed inside and outside except the rim.

Size	A	B	C
Capacity, ml	150	210	400
Diameter, mm	85	95	115
Each	**$ .50**	**.70**	**.90**

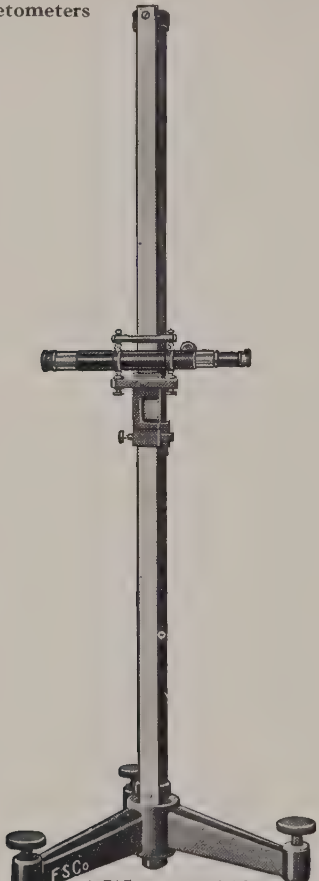
4-705. CASSEROLE, Special, Coors Porcelain. Used especially for Silica determinations. Glazed inside and outside except the rim, **with a long flat handle.**
Capacity 250 ml.; diameter 105 mm.; length of handle 90 mm. **Each, $ .85**

4-710. CASSEROLE, White Enameled, seamless steel, blue trimmed. Better quality than the ordinary kitchen ware; used extensively for making culture media and for other laboratory purposes.

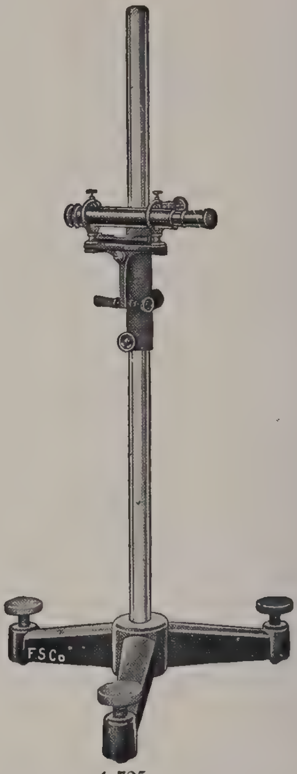
Capacity, quarts	1	2	4½
Diameter, inches	5¾	8	10
Height, inches	2¾	3½	4
Each	**$ .70**	**.90**	**1.10**

**Sizes adopted by the American Chemical Society, Standardization Committee.*

CATHETOMETERS



4-715 4-720



4-725

4-715. CATHETOMETER, Precision, with Brass Guide Bar; Range, 100 cm.; recommended for use in chemical laboratories, where the instrument is exposed to acid fumes. Cathetometers are convenient and often indispensable, when accurate measurements of vertical distances are to be made. This instrument is easily portable and is constructed for laboratory work. It is useful for accurately reading thermometers and barometers, and for taking measurements of other mercury columns; also for measuring objects, which cannot be handled with calipers or other measuring tools. To facilitate accurate setting of the cathetometer on horizontal surfaces, the telescope cross hairs are placed at right angles, through the center of the field of vision.

The telescope has an aperture of 25 mm. and is fitted with a rack and pinion, on the eye end for focusing. The objective is achromatic and is provided with an extra draw tube, which permits focusing to about 55 cm. A sensitive level is mounted on the telescope and can be adjusted. The whole telescope carriage is raised and lowered by a rack and pinion.

The guide bar is made of brass, to withstand acid fumes, and has a cross section of 32x13 mm. The scale is one meter long, divided into millimeters. The vernier can be read to 0.05 mm. The telescope carriage, which moves up and down the guide, has a slow motion adjustment for tilting the telescope.

The tripod base is large and heavy. It has steel leveling screws, with foot plates. The screws have fine threads, for accurate adjustment of the level. The whole instrument rotates on the strong, vertical support rod and can be clamped in position. **Each, $225.00**

4-720. CATHETOMETER, Precision, with Steel Guide Bar. This cathetometer is similar to No. 4-715, except that the guide bar is made of steel and has a cross section of 25x13 mm. For all laboratories not affected by acid fumes, this instrument will be found satisfactory for precision work. **Each, $195.00**

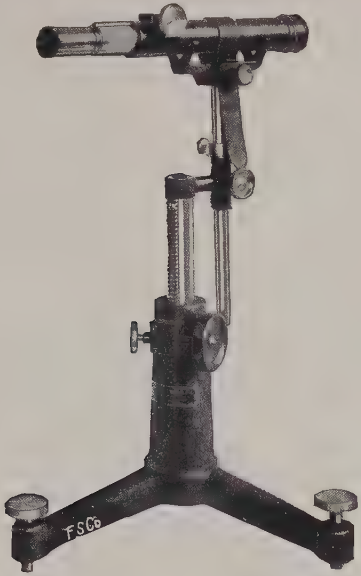
4-725. CATHETOMETER, Hand Adjustment; Range, 100 cm. The telescope carriage is raised and lowered by hand; readings down to 0.1 mm. can be made by means of the vernier. This cathetometer is used for reading thermometers, barometers, etc. It is a high grade instrument for carefully measuring distances within its range, in the vertical plane.

The telescope has an aperture of 25 mm. A rack and pinion at the eye end, is used for focusing. The objective is achromatic and has a draw tube, which can be used for a short focus of about 55 cm. The power of the lens is approximately 18 diameters. There is a spirit level and a delicate horizontal tilting adjustment for the telescope. The sleeve, on which the telescope is mounted, is fitted to the support rod and moved up or down, as desired, by hand.

The support rod is also the guide and is made of steel, white-plated, 30 mm. diameter and 120 cm. long. This rod is graduated in millimeters and the vernier on the sliding sleeve can be read to 0.1 mm. The tripod base is heavy and equipped with leveling screws. **Each, $115.00**

CATHETOMETERS Without Scales

READING TELESCOPES



4-730 4-735

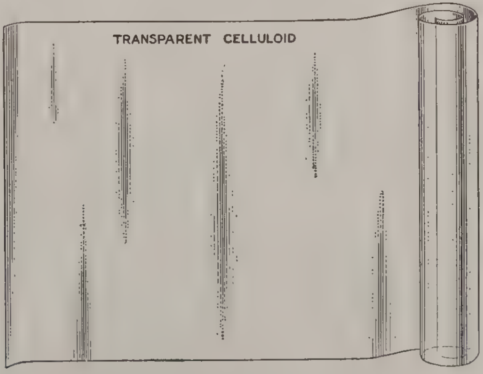
4-730. CATHETOMETER, Reading Telescope, on Support, without scale; for reading thermometers, etc.

The telescope has an aperture of 25 mm. The objective is achromatic. At the eye end, there is a rack and pinion for focusing. The eyepiece is of the Ramsden type, giving a large, flat field, free from color, with a magnifying power of 10. The focal length is about 200 mm. and the shortest focus (objective to object) is 80 cm., with magnification at 80 cm. of about 13 diameters.

The support is on a heavy tripod base, fitted with leveling screws. The telescope is mounted on a rod, which permits vertical adjustment and rotation in the horizontal plane. A rack and pinion raises and lowers the instrument. The range of the rack motion is 10 cm.; lowest position of the telescope, 27 cm. over the table; and highest position, 60 cm. over the table. **Each, $70.00**

4-735. CATHETOMETER, Reading Telescope, with Erecting Eyepiece. This instrument has the advantage over Cathetometer No. 4-730 in that it shows an upright image and, for this reason, is more convenient in reading thermometers, burettes, etc.

The construction is identical with Cathetometer No. 4-730, except that it has the Erecting Eyepiece. Supplied without a scale. **Each, $80.00**



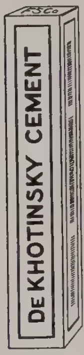
4-740

4-740. CELLULOID, Transparent Sheets; thickness 0.01 of an inch. Celluloid cylinders of small diameter are used for water gauges, under low pressure. The sheets can be cut in any shape desired or rolled into cylinders and other shapes, and cemented with Celluloid Cement, No. 4-745. Celluloid cylinders are light in weight and will stand rough handling.

Size of sheet, inches	20x25	20x50
Per sheet	**$1.00**	**2.00**

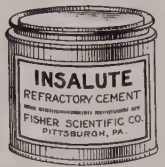
CEMENTS

4-745



4-750

4-755



4-760

4-765

CEMENT, Asbestos. See Asbestos Cement.

CEMENT, Asphaltum. See Jars, American Medical Museum.

4-745. CEMENT, Celluloid. A quick-drying cement, for making celluloid cylinders or other shapes, or for patching purposes. Put up in one-ounce bottles. **Per ounce, $ .30**

4-750. CEMENT, DeKhotinsky. This cement is not attacked by water, sulphuric acid, nitric acid, hydrochloric acid, bisulphide of carbon, benzene, gasoline or turpentine and is very little affected by ether, chloroform, caustic alkalies, etc. It is dissolved by alcohol. Made in three grades, for laboratory purposes.

Hard, for cementing glass, metal and porcelain.

Medium, for cementing small or irregular pieces of metal to face plates of lathes or milling machines for precision work, where clamping should be avoided on account of the danger of springing or bending.

Soft, for insulating and covering electric wires, for condensers, static machines, protection against corrosion and for cementing soft rubber, hard rubber, wood, ivory, etc.

The articles to be cemented are heated and the cement is applied, according to full instructions supplied with each package.

Grade	Hard	Medium	Soft
Per one-ounce package	**$ .90**	**.90**	**.90**

6 oz. assorted, 10% discount.

CEMENT, Glue. See Glue.

CEMENT, Museum Jar. See Jars, American Medical Museum.

4-755. CEMENT, Refractory, Alundum, RA-162. This is a medium coarse cement and is very satisfactorily used with base metal resistors in electrically heated appliances and in the setting up of heavy refractory constructions. It is very satisfactory for imbedding and insulating resistance wires used for electrical heating.

The cement is made from highly refractory, fused alumina and has the following properties: high thermal conductivity, about four times that of fire clay and about three times that of porcelain; chemical inactivity toward different metals; comparatively low coefficient of expansion.

This cement is also recommended for repairing muffles and linings in electric furnaces, etc.

Size of package, pounds	5	10
Per package	**$1.25**	**2.00**

4-760. CEMENT, Refractory, Insalute. An insulating cement, sometimes called "liquid porcelain," because it becomes very hard and cannot be removed without breaking it into pieces.

Insalute sticks to glass, porcelain, metal, asbestos, etc. It is fireproof and a non-conductor. The cement can be thinned and applied like paint. When mixed with refractory materials, as a binder, it can withstand temperatures up to 3500° F. After having been brought to a high temperature, this cement is unaffected by heat, water or other solvents.

Put up in one-pound cans, with instructions for use. **Per pound, $ .45**

4-765. CEMENT, Refractory, Vulcan Paste, Northrup. This cement is very plastic and cohesive and may be used in paste form to stop up cracks or to cement together pieces of refractory material. It sticks to glass, quartz, porcelain and metals and may be used in temperatures up to 2000° C., without being affected by the heat.

The paste can be thinned and used as a paint, applied with a brush. It dries at room temperature and becomes very hard when heated to 200° C. or higher.

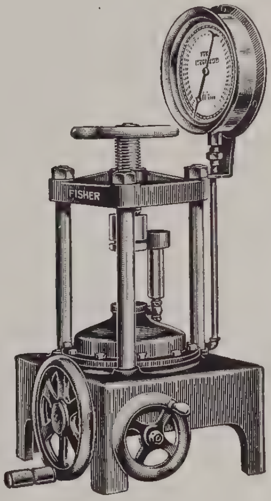
Put up in one-pint glass jars, with full directions for use. **Per pint, $3.50**

APPARATUS FOR TESTING CEMENT, CONCRETE AND AGGREGATES

FISHER

CEMENT COMPRESSION TEST MACHINE

Patented



4-770

All the apparatus listed is of standard design, to conform with the Specifications of the American Society for Testing Materials and the U. S. Government as described in:

A. S. T. M. Standard Methods for 1924	*Serial Designation, C 9-21.* *Serial Designation, D 55-24.* *Serial Designation, C 39-21 T.* *Serial Designation, C 9-16-T.*
Government Specifications for Portland Cement	*U. S. Bureau of Stds., Bulletin 33.*
U. S. Dept. of Agriculture, Testing Highway Materials	*Bulletin 1216 (May, 1924)*

4-770. CEMENT TESTING MACHINE, Fisher. For Compression Tests (Patented). A simple, rugged and compact hydraulic compressing machine, designed especially for testing cement, cement mortars and fine-aggregate concrete according to A. S. T. M. and U. S. Government methods.

For methods see, (A. S. T. M. Standard Methods for 1924, Serial Designation C 39-21T. "Methods of Making Concrete Compression Tests") also (U. S. Department of Agriculture, Bulletin No. 1216—May, 1924). The machine can be used in the laboratory or it can be used "on the job."

Compression Tests. Cement, in the past, has been tested under tension to determine its strength. In use, where concrete is subjected to tension it is reinforced with steel. The ability of different cements and cement mixtures to withstand compression is the direct information desired and that information can be obtained from tests made with this machine.

Design. The pressure is generated by means of the large hand-wheel and increases uniformly without impulses. The pressure is then transmitted to a floating ram. The floating ram, covered by a rubber diaphragm, is the patented feature of this machine. It avoids the necessity and the objections of a piston ground to fit the cylinder which introduces friction when tight, and leaks when loose. The hydraulic fluid employed is glycerine.

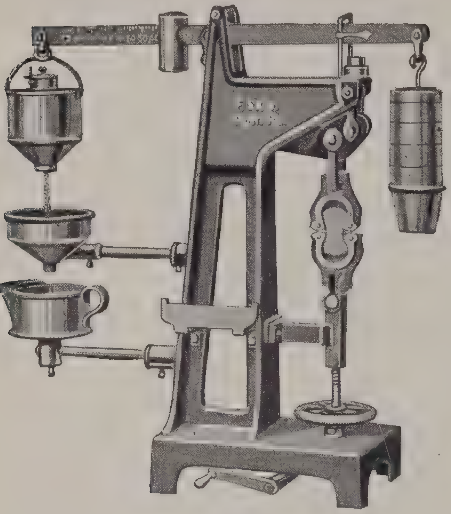
The upper block which engages the test piece is fitted with a ball-and-socket joint.

The machine is designed with ample capacity for 2x4 inch cylinders made in Molds Nos. 4-806 and 4-807, also for crushing 2 inch cubes made in Molds Nos. 4-808 and 4-809. These sizes are sufficient for testing cement, cement mortars and fine-aggregate concretes.

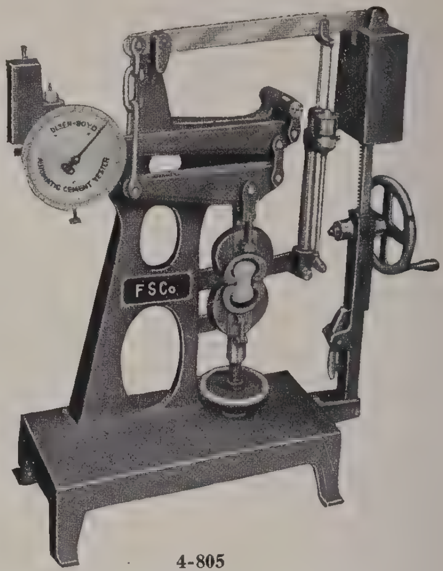
Operation. The test piece is placed on the hydraulic elevating platform, and the upper block is then run down on the idle screw, by means of the hand lugs, until it engages the upper surface of the test piece. The large hand wheel is then turned until sufficient pressure is applied to fracture the test piece. When the point of fracture is reached, the hand of the pressure gauge swings back. The total pressure generated, divided by the area of the test piece, gives the crushing strength.

Machine without molds for test pieces. **Each, $350.00**

For Compression Test Cement Molds, see No. 4-806 to No. 4-809, inclusive.



4-795



4-805

4-795. CEMENT TESTING MACHINE, for Tensile Strength Test. For making tests according to A. S. T. M. Standard Methods for 1924, Serial No. C 9-21, and U. S. Bureau of Standards, Circular 33.

Method of Making Test. A standard briquette, made in Mold No. 4-815, is placed in the clamp at the right, and the apparatus is adjusted by counterbalancing test weights with shot placed in the bucket at the left. The breaking force is applied by opening the piston valve on the bottom of the bucket, and permitting the shot to flow through to the receiver below. When a sufficient amount of shot has flowed out of the bucket, the unbalanced weight breaks the briquette, raises the partly emptied bucket, and so stops the flow of shot. By weighing the quantity of shot used to balance the weights and the quantity left in the bucket when the briquette is broken, the breaking strength of the test piece may be calculated.

The **Apparatus** has a capacity of 1000 lbs. (500 kgm.), and is constructed entirely of metal. The beam is graduated to 100 lbs. in 1 lb. divisions, insuring accuracy in reading. Clamps for holding the test piece are made according to latest specifications as to rollers, size, shape, etc. An auxiliary hand wheel at the base of the apparatus permits of fixing a definite initial load on the test piece, before the actual breaking load is applied. Supplied with 1 pair solid back briquette grips and 1 cement mold, but not with shot.
For Tension Test Cement Molds, see No. 4-810 to No. 4-825, inclusive. **Each, $200.00**

4-800. LEAD SHOT, for No. 4-795 Cement Testing Machine. This shot is all tested for uniformity of size and shape, so as to give a uniform flow of shot through the apparatus. **Per bag** (25 lbs.), **$5.00**

4-805. CEMENT TESTING MACHINE, Automatic, for Tensile Strength Test. This machine is similar in principle to the No. 4-795 Cement Testing Machine, but does not employ shot for applying the load. In this machine the load is applied by means of a falling weight, the motion of which is hydraulically controlled and may be varied at will.

In this type of machine, the method of indicating the maximum load is independent of the amount of the load, character of the break of the briquette and recoil or stoppage of the flow of shot. This eliminates the "lag" of the older type instruments, and makes the indicated load more nearly equal to the load under which the test piece is broken.

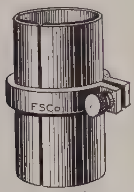
Method of Making the Test. To make a test with the Automatic Tension Machine, a standard briquette is placed in the clips and the initial load applied through the hand wheel at the base of the machine. The latch on the lower part of the weight supporting rod is then released, applying the load to the briquette. This load is indicated by a pointer on the dial. It moves as the load increases and stops at the maximum point regardless of the kind of break encountered. After a test, the pointer is reset at zero by pushing up the plunger just below the dial, while the weight is reset by means of the hand wheel at the side. The apparatus is then ready for another test.

Design. This machine is entirely self-contained, and is fitted with clips having the latest A. S. T. M. rollers and is designed for all Standard Tension Tests. The lever system is more than sufficient to break any briquette, thus eliminating the use of any hand crank.

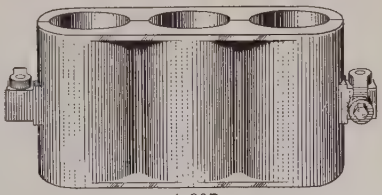
The rate of loading is governed by the valves in the hydraulic system, set for the Standard Rate of 600 lbs. per minute, but may be varied at will to accommodate other tests. For preventing premature breaking of the briquette, the ratchet attachment at the base may be set for any desired initial load. Once set, any amount of additional turning of the wheel will cause the ratchet to "cut off," and thus prevent any increase in initial load.

This machine has a capacity of 1000 lbs. (500 Kg.), and measures 32 inches by 11 inches and 40 inches high. Supplied without molds. **Each, $350.00**

For Tension Test Cement Molds, see No. 4-810 to No. 4-825, inclusive.



4-806



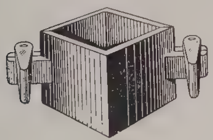
4-807

4-806. CEMENT MOLD, A. S. T. M., Cylinder, Single. For making cylindrical test pieces of cement mortars 2 inches diameter and 4 inches high for compression tests in Machine No. 4-770. Made according to A. S. T. M. Tentative Standard for 1924, Serial Designation, C 9-16T.

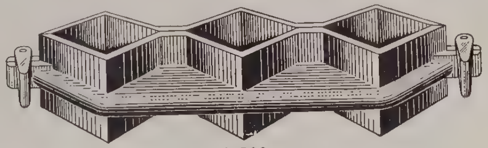
The mold is made of polished brass and is provided with a quick-acting one-piece screw which is more convenient than the old form using a bolt and nut.

It is recommended that the mold be oiled before using and that the mold rest on Glass Plate No. 4-930 when being filled. **Each, $4.25**

4-807. CEMENT MOLD, A. S. T. M., Cylinder, Triple. For making three cylindrical test pieces, 2 inches diameter and 4 inches high; same as No. 4-806, but designed to make 3 test pieces with one filling. **Each, $11.75**



4-808

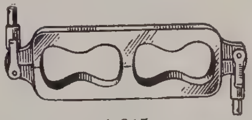


4-809

4-808. CEMENT MOLD, Cube, Single. For making cubical test pieces of cement mortars, 2 inches on a side, for compression tests in Machine No. 4-770. The mold is made of brass and is provided with a quick-acting clamp. It is recommended that the mold be oiled before using and that the mold rest on Glass Plate No. 4-930 when being filled. **Each, $6.25**

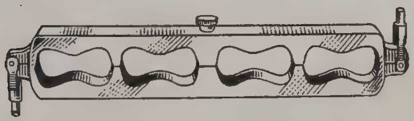
4-809. CEMENT MOLD, Cube, Triple. For making three cubical test pieces, 2 inches on a side; same as No. 4-808, but designed to make 3 pieces with one filling. **Each, $15.75**

4-810



4-815

4-820



4-825

4-830

4-810. CEMENT MOLD, Tension Briquette, Single. Makes the standard tension briquette as specified in A. S. T. M. Standard Methods for 1924, Serial Designation C 9-21, "Standard Specifications and Tests of Portland Cement." These briquettes are pulled apart in Machines Nos. 4-795 and 4-805.

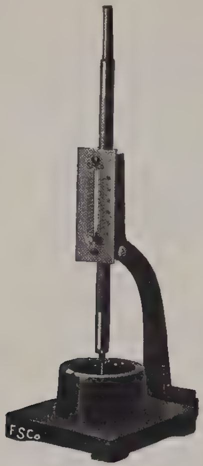
The mold is made of brass, accurately machined so the cross-section at the center is exactly one inch and the shape of the briquette is exactly in accord with the A. S. T. M. specifications. The mold is fitted with a quick acting clamp. **Each, $3.75**

4-815. CEMENT MOLD, for Two Tension Briquettes. Similar to No. 4-810, but designed to make two briquettes at one filling. **Each, $7.50**

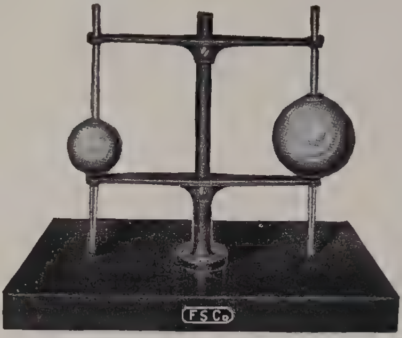
4-820. CEMENT MOLD, for Three Tension Briquettes. Similar to No. 4-810, but designed to make three briquettes at one filling. **Each, $10.00**

4-825. CEMENT MOLD, for Four Tension Briquettes. Similar to No. 4-810, but designed to make four briquettes at one filling. **Each, $13.00**

4-830. CEMENT MOLD BRUSH, for cleaning metal, molds, etc. Made of wood with brass wire bristles, one inch long. Brush 10 inches long, 1 inch wide, with bristles extending for a distance of five inches from the end. **Each, $1.20**



4-835



4-840

4-835. CEMENT CONSISTENCY TESTER, Vicat Needle; for determining the normal consistency, standard consistency, and time of setting of cement.

Apparatus consists of a frame bearing a movable rod of 300 grams weight, one end of which is 1 centimeter in diameter for six centimeters, the other end being fitted with a removable needle 1 millimeter in diameter and 6 centimeters long. The rod is reversible and can be held in any desired position by means of a screw, and carries an indicator which moves up over a scale graduated in millimeters and attached to the frame. The cement pat to be tested is held in a conical hard rubber ring 7 centimeters in diameter at the base and 4 centimeters high resting on a glass plate 10 centimeters square. The consistency of cement is determined by the time taken for the rod to settle to a point 10 millimeters below the original surface. A cement is said to be of normal consistency when this occurs within one half minute after the rod has been released. From the consistency determination, the percentage of water necessary to be mixed with the cement for producing a standard mortar, can readily be determined.

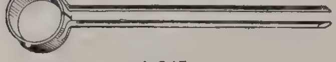
For determining the time of setting, a paste of normal consistency is made and molded in the hard rubber ring, and placed under the rod. The smaller end is then carefully brought in contact with the surface of the paste, and the rod quickly released. Initial set is said to have occurred when the needle does not sink visibly into the paste, using the coarse needle, and the final set, when the needle does not visibly sink into the paste, using the fine needle. For further details of the methods, see A. S. T. M. Standard Methods for 1924, Serial Designation C 9–21, also U. S. Bureau of Standards, *Bulletin 33*, and Batson and Hyde, *Mechanical Testing*, Vol. I, 395 (1922).

Vicat Needle Apparatus, complete on Stand, with needles and cement mold of hard rubber as recommended by the U. S. Bureau of Standards. **$27.50**

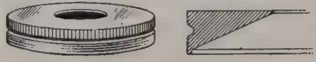
4-840. CEMENT SET-TIME TESTER, Gilmore Needles. For the determination of the Time of Setting of Cement, according to the A. S. T. M. Standard Methods for 1924, Serial Designation C 9–21.

Apparatus consists of two steel needles, one $^{1}/_{12}$ inch in diameter weighing ¼ lb. and the other $^{1}/_{24}$ inch in diameter and loaded to weigh 1 lb. Both needles are conveniently mounted in a rack, so as to be perpendicular to the surface of the pat during the test. The coarse needle is used to determine the Initial Set of the cement, by noting the time taken for the cement to harden sufficiently to bear the needle without appreciable indentation. The fine needle is used similarly to determine the Final Set.

Per set, $12.00



4-845



4-850

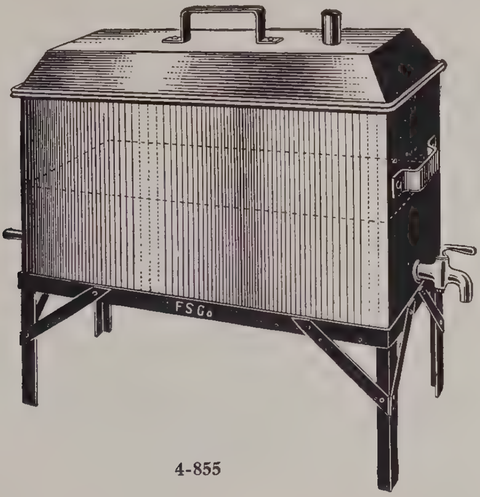
4-845. CEMENT SOUNDNESS TESTER, Le Chatelier. This mold is used in the determination of the Soundness of Cement, by measuring the expansion of cement when heated for a period of time in an atmosphere of steam or boiling water.

The apparatus consists of a brass split ring, to the ends of which are fastened two long parallel indicating arms. As the cement expands, the ring is spread and the distance between the free ends of the indicating arms is increased giving an index of the degree of soundness. For further details see A. S. T. M. Standard Methods for 1924, Serial Designation C 9-21, also International Association of Testing Materials, Proceedings Paper X_3 (1909) and Batson and Hyde, *Mechanical Testing*, Vol. 1, 396 (1922). **Each, $5.00**

4-850. CEMENT SOUNDNESS-TEST MOLD, Pat Type. For use in the Soundness and Time-of-Setting Tests for Cement.

This mold is of solid brass, 3 inches in diameter and ½ inch thick. The interior is the shape of a frustrum of a cone with the lower base 3 inches in diameter and the upper base 1 inch in diameter. Around the lower base is a ½ millimeter retaining edge which insures the pat being of uniform thickness at the outside edge.

The outer surface of the mold is grooved, and the portion above the groove is milled to afford a good grip on the wetted mold during filling. **Each, $4.00**



4-855

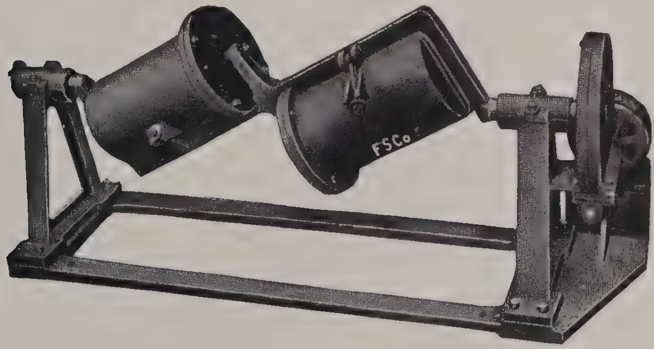
4-855. CEMENT STEAMING APPARATUS. For use in **Soundness Test** as described in A. S. T. M. *Standard Methods for 1924*, Serial Designation C 9–21. The test pieces are made in Mold No. 4–850.

Method. A pat from cement of normal consistency is stored in moist air for 24 hours, and then placed in an atmosphere of steam at 98–100° C. for 5 hours.

Apparatus consists of a heavy copper steam chest 15x15x30 inches, supported by an iron stand. The lower part of the chest is provided with a constant level device for maintaining the supply of water, and a drain cock for cleaning purposes. Handles on the ends and a removable cover, fitted with vent holes, complete the external equipment.

A shelf of 1/16 inch galvanized iron wire, serves to support the briquettes at the proper height above the boiling water.

Entire apparatus is designed to give continuous and reliable service, with a minimum of attention and upkeep. **Each, $60.00**



4-860

4-860. ABRASION MACHINE, Standard, for Broken Stone and similar road materials. This machine is built along the lines of the original "Deval, French School of Roads" machine, and modified to conform with the specifications of the A. S. T. M. *Standard Methods for 1924*, Serial Designation D 2–08, and U. S. Department of Agriculture, *Bulletin 1216*, May, 1924.

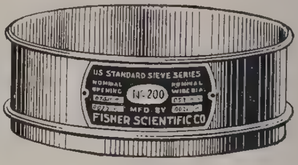
The machine consists of two hollow iron cylinders, 20 cm. in diameter and 34 cm. deep, closed at one end and fitted with an iron cover at the other. The cylinders are mounted on a shaft at an angle of 30° to the axis of rotation of the shaft. Machine is supplied with a tight and loose pulley for belt drive. Each machine is provided with a counter for noting the number of revolutions. **Each, $415.00**

If desired, this machine can also be supplied, fitted with three or four cylinders of the same size.

F. S. Co.—U. S. STANDARD
CEMENT SIEVES

4-880

4-880
See page 153



4-880

REGARDING CEMENT TESTING SIEVES

If two sieves have the same number of meshes per unit of length but are made of different sized wires, the sieve openings will not be the same. On account of this, there has been considerable confusion in the past as to just which "Sieve Series" should be used in making precise fineness determinations. This has been caused by the fact that different manufacturers of sieves adopted their own series, and different laboratories chose different "Sieve Series" for making the same test.

This confusion is now being cleared by the adoption of the United States "Standard Sieve Series" as specified by the United States Bureau of Standards in "Circular Letter LC 74" (April 15th, 1924). The American Society for Testing Materials has adopted this U. S. Standard Series in the 1924 Standard Methods for the following:

Specifications and Tests for Portland Cement..............A. S. T. M. Serial Designation C 9-21.
Specifications for Natural Cement........................ A. S. T. M. Serial Designation C 10-09.
Method of Test for Sieve Analysis of Aggregates for Concrete A. S. T. M. Serial Designation C 41-24.

These sieves have also been adopted by different Departments of the United States Government and the American Association of State Highway Officials. We recommend the United States Standard Sieve Series for every accurate determination of fineness.

UNITED STATES STANDARD SIEVE SERIES

A sieve opening one millimeter square, is the unit adopted for this series, and the ratio of any sieve opening to the next smaller opening in the series is definitely fixed. The diameter of wire for each sieve has also been fixed. Although the dimensions used as a basis for this series are in the Metric system, the dimensions in inches are also given for each sieve and users may refer to these dimensions if they prefer.

In this series, each size has been assigned a number which refers to the specifications for that sieve, and as this number very closely approximates the mesh-per-inch it serves as an identification in terms of "mesh." This will be observed from the following specifications.

*SPECIFICATIONS FOR U. S. STANDARD SIEVE SERIES

Sieve No.	*Sieve Opening Millimeters*	*Sieve Opening Inches*	*Wire Diameter Millimeters*	*Wire Diameter Inches*	*Tolerance Average Opening + or —*
4	4.76	.187	1.27	.050	3%
8	2.38	.0937	.84	.0331	3%
10	2.00	.0787	.76	.0299	3%
16	1.19	.0469	.54	.0213	3%
20	.84	.0331	.42	.0165	5%
30	.59	.0232	.33	.0130	5%
40	.42	.0165	.25	.0098	5%
50	.297	.0117	.188	.0074	6%
60	.250	.0098	.162	.0064	6%
70	.210	.0083	.140	.0055	6%
80	.177	.0070	.119	.0047	6%
100	.149	.0059	.102	.0040	6%
120	.125	.0049	.086	.0034	6%
140	.105	.0041	.074	.0029	8%
170	.088	.0035	.063	.0025	8%
200	.074	.0029	.053	.0021	8%
230	.062	.0024	.046	.0018	8%
270	.053	.0021	.041	.0016	8%
325	.044	.0017	.036	.0014	8%

**Bureau of Standards,*
Washington, D. C.
April 15, 1924

For list of prices, see No. 4-880, page 153.

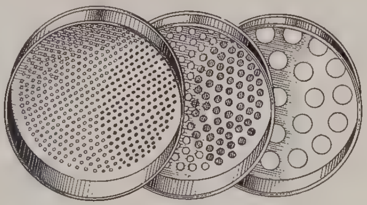
F. S. Co.—U. S. STANDARD

CEMENT SIEVES

See page 152 for discussion and detailed specifications

4-880
See also No. 4-890

4-895
See also No. 4-885



4-900

4-880. SIEVES, F. S. Co. United States Standard, Brass Frame, 8 inches diameter. Used in making precise fineness determinations of Cement, Sand, Slag, Stone Screenings and other fine Aggregates.

These sieves are made according to the specifications for the United States Standard Sieve Series as explained on page 152. The frames are made of brass and are 8 inches diameter, which is the only size recommended by the U. S. Bureau of Standards. The frames are 2½ inches high and are spun from one piece, without a seam. Each sieve is supplied in a separate pasteboard carton.

For size of sieve opening and diameter of wire for each sieve number, see table of specifications given on page 152

Sieve No.	4	8	10	16	20	30	40	50	60	70
Each	**$5.00**	**5.00**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**	**4.85**	**5.00**

Sieve No.	80	100	120	140	170	200	230	270	325
Each	**$5.50**	**6.15**	**6.50**	**7.30**	**7.80**	**9.50**	**11.50**	**16.00**	**20.00**

For Cement Testing. Set consisting of Sieve numbers 100 and 200 with Cover and Receiver No. 4–885, is used.

For Sand Testing. Set consisting of numbers 10, 20, 30, 40, 50, 80, 100, 200 with Cover and Receiver No. 4–885, is used.

For Fine Aggregates. Set consisting of numbers 4, 8, 16, 30, 50, 100 with Cover and Receiver No. 4–885, is used.

4-885. COVER and RECEIVER, Brass, 8 inches diameter, to be used with Nos. 4-880 and 4-890 Sieves.
Per set, $3.50

4-890. SIEVES, Certified, United States Standard. For Cement Testing. These sieves are made according to the U. S. Standard Specifications as outlined above, and have been **certified by the United States Bureau of Standards.**

The Bureau's Certificate is furnished with each sieve, giving the correction. The 200 mesh sieve is given a sieving test with a standard sample of cement, and the sieving correction thus obtained is incorporated in the certificate.

Sieve No.	100	200
Each	**$12.00**	**16.00**

4-895. SIEVES. Cement Set, Certified, Brass Frame, 8 inches diameter. Set consists of one each No. 4–890 sieves, 100 and 200 mesh with one Cover and Receiver. Each sieve supplied with a United States Bureau of Standards Certificate.
Per set, $30.00

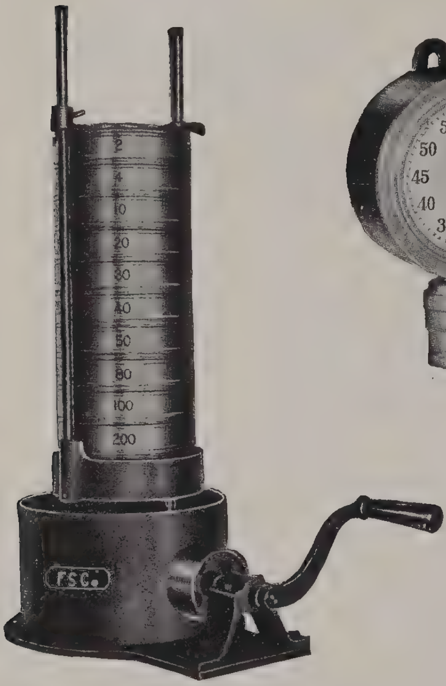
4-900. SIEVES. For Stone Testing, Round Holes, Brass Frame, 8 inches diameter. These sieves have circular openings in brass sheet and are recommended in A. S. T. M. Standard Methods for 1924, Serial Designation D 18–16 "Mechanical Analysis of Broken Stone or Slag."

Diam. of sieve opening, inches	2	1½	1¼	1	¾	½	¼
Diam. of sieve opening, cm	5.08	3.81	3.18	2.54	1.90	1.27	0.64
Height of frame, inches	2½	2	1⅝	1⅝	1⅝	1⅝	1⅝
Each	**$5.25**	**4.50**	**3.75**	**3.75**	**3.75**	**3.75**	**3.75**

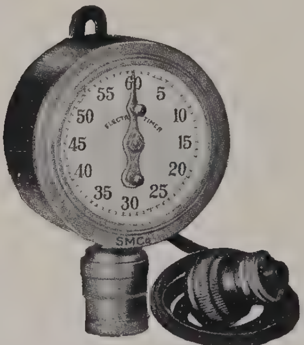
Sieves with larger openings made to order.

SIEVES, for ordinary grading purposes, are listed under Sieves in this catalogue.

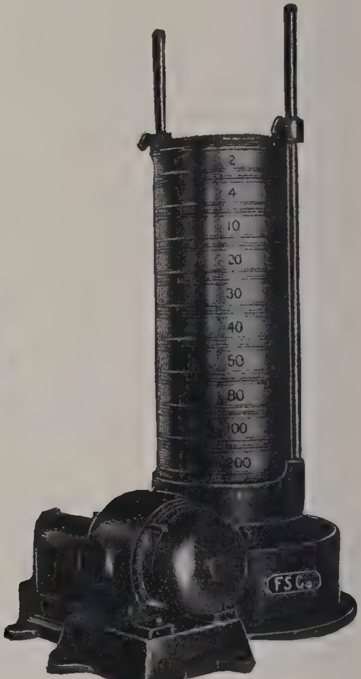
CEMENT SIEVE SHAKERS



4-905



4-920



4-910 4-915

4-905. CEMENT SIEVE SHAKER, Hand and Power Driven, for the automatic grading of cement, sand, etc., according to size.

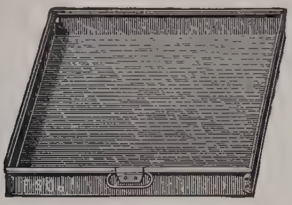
This shaker converts, by means of cams, the rotary motion of the drive wheel to a semi-rotary excentric throw followed by a vertical drop. This motion serves to keep the cement moving progressively around the Sieve, and at the same time, cleans the meshes of any clogging. The time necessary for making a test is thus greatly shortened. As the stroke is always of the same character and strength, the test can be standardized, and so be made reproducible, thus eliminating any of the inaccuracy due to the hand shaking method.

Machine is mounted on heavy cast base with heavy sieve supports and clamps. It will accommodate sieves, cover and receiver of the A. S. T. M. Standard 8 inch, Full Depth Size. Machine is supplied complete, but without sieves, for hand power. **Each, $150.00**

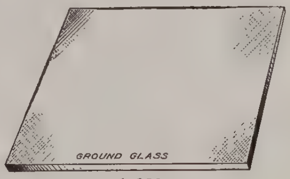
4-910. CEMENT SIEVE SHAKER, AUTOMATIC, ELECTRICALLY DRIVEN. This shaker is the same as the No. 4–905, but is directly coupled to a **110-Volt Direct Current Motor.** **Each, $300.00**

4-915. CEMENT SIEVE SHAKER, AUTOMATIC, ELECTRICALLY DRIVEN. This shaker is the same as the No. 4–905, but is supplied with **110-Volt, Alternating Current Motor.** **Each, $300.00**

4-920. AUTOMATIC INTERVAL ELECTRIC TIMER, for use with No. 4-910 and No 4-915 Automatic Sieve Shakers. This Timer consists of an electrically operated clock and circuit breaker. The clock is of special rugged construction for heavy duty and hard usage. It never requires winding. When the hand is turned to the right the switch is closed and the clock starts. The hand can be set for any time period up to 60 minutes. At the end of the time period for which it has been set, the clock will automatically open the circuit, but will continue to run for two minutes for additional safety. After once having been set, the clock may be reset to change the length of run by merely resetting the hand. By turning it back to zero, the circuit may be opened and the test stopped. The Timer is supplied with a cord and plug for direct insertion into a lamp socket of the laboratory, and has a receptacle for receiving the plug of the Sieve Shaker. By using this Timer a test may be started, and the clock set. The operator is then free to go about and make other tests. When the shaker has been in operation the required time, the clock automatically stops it and the test is ready for the operator to take up and complete at his leisure. **Each, $15.00**



4-925

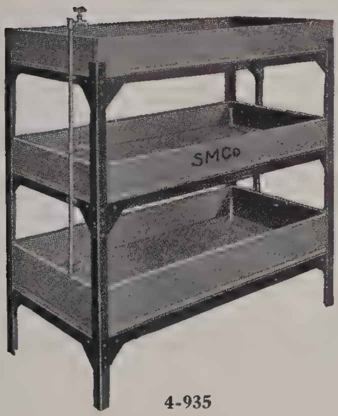


4-930

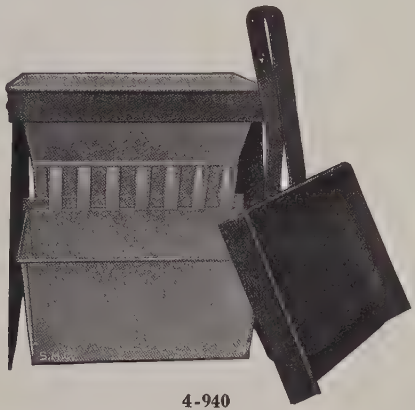
4-925. CEMENT PAN, Immersion; for immersing cement briquettes in water during the preliminary set. The pan is made of heavy, galvanized sheet iron and measures 24 inches square by 3 inches deep. **Each, $4.75**

4-930. CEMENT PLATE, Mixing; used to prepare sample batches for briquettes to be used in the compression, tensile strength and soundness tests. The glass plate serves as a convenient "backing" for the molds, because the surface is ground true and the smooth surface of the plate does not stick to the molded sample when dry.

The plates are made from heavy plate glass, ¼ inch thick, ground on one side, and are 24 inches square. The edges are ground and chamfered to prevent cutting the hands. **Each, $5.00**



4-935



4-940

4-935. CEMENT IMMERSION RACK. For the storage of test pieces during the immersion period preceding the tensile and compressive strength tests. See A. S. T. M. *Standard Methods for 1924*, Serial Designation C 9-21, "Tests for Portland Cement."

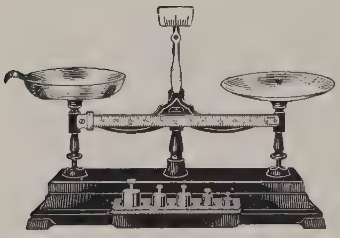
The Rack consists of three superimposed trays or tanks of soapstone supported on a heavy angle-iron frame. The lowest tray is 8 inches deep while the two upper ones are 6 inches deep. This affords ample water depth to insure all test pieces being submerged. All three sections are provided with running water, overflow and drain pipes. Tank is 6 feet 3 inches long by 3 feet 3 inches wide by 6 feet high. **Each, $550.00**

4-940. CEMENT AND ROAD MATERIALS RIFFLE, for the rapid preparation of samples of cement and road materials by the quartering method.

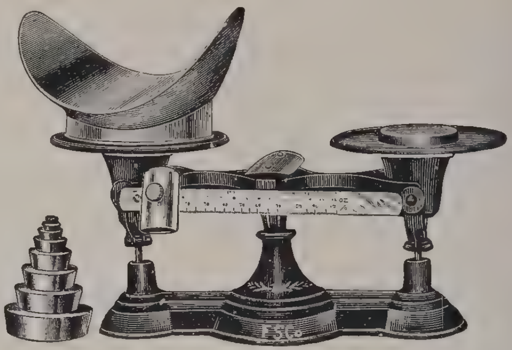
The sample is poured into the riffle at the top, and is divided into two equal parts by means of parallel chutes, the alternate ones emptying into the same pan. The contents of each pan are then run through the riffle again, dividing the total sample into quarter portions, all containing the same quantity of material of average composition. By this method four samples of a material are always obtained, one for test, one for file, one for purchaser, and one for referee. This riffle makes sampling a simple, accurate and reproducible operation, and eliminates all errors due to hand mixing, weighing, etc.

Road Materials Riffle complete with distributing scoop, **four** sample collecting pans, and **hair brush for** collecting fine material and cleaning riffle after use.

Length, inches	8	10
Number of Dividing Troughs	10	10
Width of Dividing Troughs, inches	½	¾
Each	**$15.00**	**19.00**



2-050



2-105

2-050. CEMENT FINENESS BALANCE. For use in determining Specific Gravity and Fineness of Cement. This balance is a small, fairly sensitive balance, and serves as a general laboratory balance as well as a cement balance. Used to weigh the cement which passes through or is retained by the different sieves.

The **pans** are nickel-plated; the one on the right is 4 inches in diameter and slightly concave, while the weighing pan on the left is 3½ inches in diameter, is dished about ½ inch, has a handle and is removable. This permits rapid weighing directly in the pan, without the need of using a separate weighing tin.

The **beam** is graduated for 8 grams in $^1/_{10}$ gram divisions. An indicator attached to the beam moves over a graduated index plate to facilitate reading.

The **weights** are of brass, 50 to 5 grams, and are held in a shelf at the front of the base.

Capacity, 110 grams. **Sensitivity, $^1/_{10}$ gram.** **Each, $16.50**

2-105. CEMENT MOISTURE BALANCE, for determining the moisture content of Cement, also the fineness of Sand, according to the A. S. T. M. *Standard Methods for 1924*, Serial Designation C 9-21, and U. S. Bureau of Standards, *Bulletin 33*.

This is a rugged, general utility balance, but due to the beam calibration is particularly adapted for moisture in sand and cement determinations.

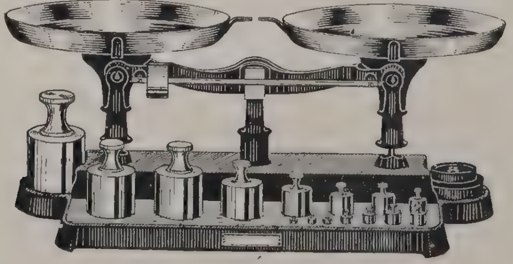
To determine the percentage of moisture absorbed by sand, a one-pound sample of the material is weighed out in the dry state. After this has been permitted to absorb moisture, it is again placed in the pan and the balance brought to equilibrium by means of the weight on the beam. The percentage of moisture is then read directly on the beam scale.

To determine the percentage of moisture contained in a sample of cement or sand, a one-pound sample is weighed out and then dried under specific conditions. A one-pound weight is placed on the left-hand pan, the sample in the scoop on the right, and equilibrium established by moving the weight on the beam scale. The percentage loss is then read directly from the beam scale.

NOTE: If a two-pound sample is used, the percentage loss is just one-half the indicated scale reading; with a three-pound sample, one third the reading, etc.

The balance has a removable **scoop** 15x7½ inches, and a tared counterbalanced weight to be used with it. The **beam is graduated in two scales:** The upper one 0 to 100% in 1% divisions, the lower one 0 to 16 oz. in ¼ oz. divisions.

The **weights** are of iron, 2 lbs. to ½ oz. **Capacity, 4 lb.** **Sensitivity, $^1/_{16}$ oz.** **Each, $19.75**

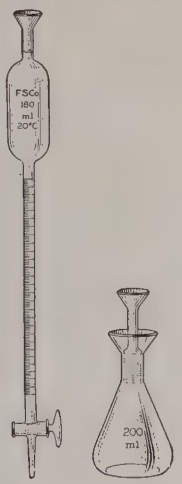


2-090

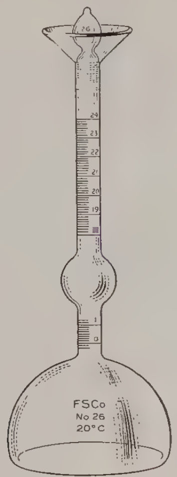
2-090. CEMENT TEST PIECE BALANCE, Medium Size. Used to weigh the materials for making cement and concrete test pieces. This balance has been designed for rugged work, and is particularly well suited for cement testing. The pans are removable, made of brass, 5½ inches in diameter, and can be used directly for weighing. However, where weighing is to be done by difference, a sliding weight on the balance arm can be used to counterbalance the extra container and so eliminate the "tare" weighing.

Balance is supplied with a set of brass weights, 500 to 1 gram, mounted on the shelf in front of the base.

Capacity, 1 kilo. **Sensitivity, ½ gram.** **Each, $35.50**



4-950



4-955 4-956

4-950. SAND SPECIFIC GRAVITY APPARATUS, Jackson. For use in determining the Specific Gravity of Sand, Stone, Screenings and other similar highway materials, as described in A. S. T. M. *Standard Methods for 1924*, Serial Designation D-55–24, and U. S. Department of Agriculture, *Bulletin 1216*, May, 1924.

This **Apparatus** consists of a burette about 28 cm. long, with stopcock at the bottom and a bulb 13 cm. long at the top. The neck of the bulb is drawn down and has a calibration mark extending around it. The bulb holds exactly 180 ml. between this mark and a similar mark just below the bulb proper, on the burette. The burette is graduated to read Specific Gravity from 2.5 to 3.5 in 0.01 parts.

An Auxiliary Apparatus consists of an Erlenmeyer flask, with a hollow, ground glass stopper with neck of the same bore as the burette, and having a capacity of exactly 200 ml. up to the graduation on the neck of the stopper. **Each, $8.00**

4-955. CEMENT SPECIFIC GRAVITY BOTTLE, Le Chatelier. For use in determining the Specific Gravity of Cement according to the A. S. T. M. *Standard Methods for 1924*, Serial Designation C 9–21, and U. S. Bureau of Standards, *Bulletin No. 33*.

Bottle has a capacity of 250 ml. with a bulb blown in the neck The portion below the bulb is of 1 ml. capacity, and is graduated in 0.1 ml. divisions, with two 0.1 ml. graduations extending above the 1 ml. mark and below the 0 mark. The bulb in the neck is ungraduated, but has a capacity of 17 ml. Beyond this, the neck is graduated from 18 to 24 ml. in 0.1 ml. All calibrations have been made in ml. at 20° C. The mouth is flared so as to facilitate filling, and is fitted with a ground stopper. **Each, $5.50**

4-956. CEMENT SPECIFIC GRAVITY BOTTLE, Le Chatelier, U. S. B. S. Certified. Same as No. 4-955 but tested by the United States Bureau of Standards. **Each, $9.00**

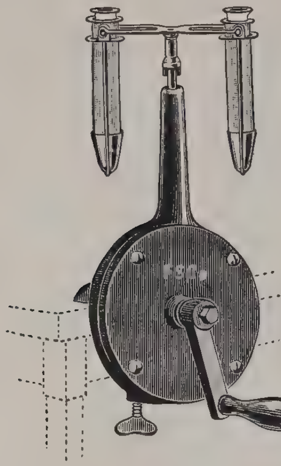
4-958

4-960

4-958. CEMENT SAND, Standard; used to make up standard briquettes and pats. This sand is pure silica, 20 to 30 mesh. It has been specially prepared to conform to the U. S. Bureau of Standards Specifications, *Circular No. 33*, and also to conform to the specifications, A. S. T. M. *Standard Methods for 1924*, Serial Designation C 9–21. Supplied only in 100 pound bags. **Per bag, $6.00**

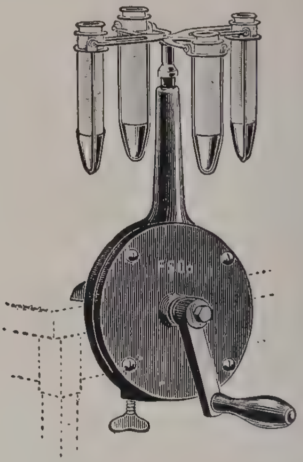
4-960. CEMENT TROWELS, Standard Design; used for mixing cement batches, for filling molds, etc. The trowels are made of heavy steel, with wooden handles; the blades are flat and are pointed.

Length of blade, inches	5	7
Each	**$1.00**	**1.25**



5-000

CENTRIFUGES



5-005

REGARDING THE USE OF CENTRIFUGES

GRAVITY vs CENTRIFUGAL FORCE

Time is the most expensive "reagent" employed in the laboratory. A centrifuge will diminish the ordinary precipitating time of a product by 500 to 1000 times. This means that in the Petroleum Industry, bottom settlings, acid sludge and water emulsions which sometimes take days to settle, may be separated in less than five minutes. In food analysis, cream and butter fat may be separated in a few seconds, and essential oils extracted in a few minutes; in paint technology, there is really only one feasible way of separating a vehicle from the pigment—i.e., by use of the centrifuge.

In Biology, Physiology and Medicine, the production of serums, extracts, bacterial segregations, which through precipitation, chemical synthesis or dialysis takes days or weeks, may be accomplished in a few minutes. In fact, in every branch of chemical technology, in both the analytical or production phase, the centrifuge saves time and money and should be used for many operations that are now being performed in other ways.

The rate of settling or sedimentation of a solid in suspension in a liquid, depends on the nature of the liquid, the size of the particles, and the attraction of gravity on them. In ordinary practice, it is impractical to speed up the settling by either changing the nature of the liquid or the size of particles. The only manner in which it can therefore be accomplished is to increase the force which tends to separate the particles from the liquid. Gravity cannot be altered, but in its stead may be substituted another more powerful force, that of the centrifuge. Centrifugal force varies as the mass of material revolving, the radius of revolution or gyration, and as the square of the speed; or where

$$\left.\begin{array}{r@{\;=\;}l} F & \text{the centrifugal force} \\ 0.0109 & \text{a constant} \\ M & \text{mass of liquid under treatment} \\ R & \text{radius of gyration} \\ N & \text{number of revolutions per minute} \end{array}\right\} \quad F = 0.0109 \times M \times R \times N^2$$

To get a better idea of just what this means in practice, let us take a concrete example. Assuming a one gram charge of liquid, 16 cm. from the center of gyration, and revolving at 2000 r.p.m.; the force exerted would be about 698,000 dynes or equivalent to about 711 times the attraction of gravity on the liquid. In other words, with the centrifuge, the tendency to settle the particles is increased over 700 times. Considering the time factor, this means that with the centrifuge it takes $^1/_{700}$ the time to settle the liquid.

CENTRIFUGES, for Milk Testing, see Milk Testing Apparatus.

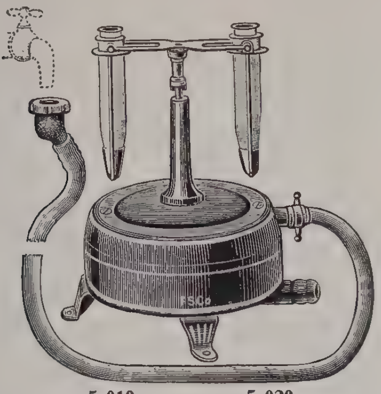
5-000. CENTRIFUGE, **Hand Driven, Two 15 ml. Tubes.** This is a strong and substantial centrifuge used by Physicians and in laboratory work, for quickly separating the solids in a small sample of liquid.

Construction. The gears in this machine are made of **Bronze Metal** which increases the durability of the centrifuge. Built with Babbitt Metal bearings and ball bearing rest, which construction decreases the friction; the housing is entirely dust-proof. The handle is equipped with a release-clutch so that it disengages when the hand power is stopped and the tubes come to rest slowly and smoothly and the sediment is not disturbed. With this centrifuge, speeds up to 2500 revolutions per minute can be attained.

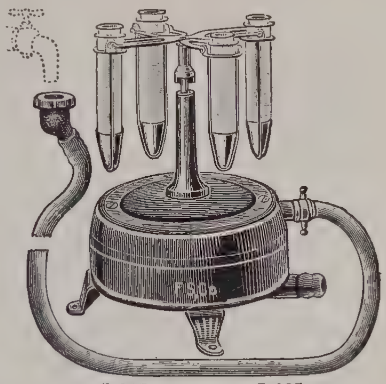
Safety Holders carry the shields and support them from the bottom and not at the neck as in the ordinary centrifuge.

The Centrifuge is supplied with one No. 5-500 plain glass tube 15 ml. and one No. 5-490 graduated 15 ml. tube, both of standard sizes and readily replaced from our stock; also two aluminum shields which protect the tubes. **Each, $15.00**

5-005. CENTRIFUGE, **Hand Driven, Four 15 ml. Tubes.** This centrifuge is the same as No. 5-000 and has all the features described under that number, but is equipped with a head and safety holder for 4 tubes, and is supplied with 4 aluminum shields, also two No. 5-500 plain and two No. 5-490 graduated 15 ml. glass tubes, both of which are standard sizes. **Each, $17.50**



5-010 5-020



5-015 5-025

5-010. CENTRIFUGE, Water Motor, Two 15 ml. Tubes. A substantial convenient centrifuge with some features in its construction which add materially to its durability and satisfactory operation. A four-foot hose with a smooth connection enables the centrifuge to be quickly attached to the ordinary faucet. This centrifuge will operate without noise and without attention.

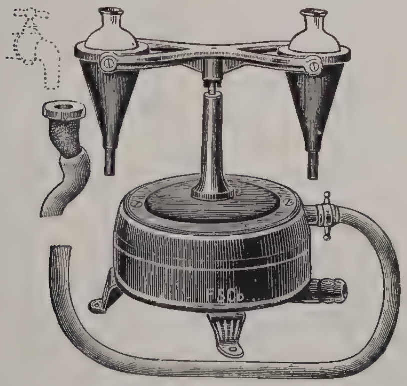
Equipped with ball bearings which are protected from the water so that they do not rust and the oil does not wash out. Provided with **Safety Holders** which support the two aluminum shields at the bottoms; supplied with one No. 5-500 plain glass tube 15 ml. and one No. 5-490 graduated tube 15 ml. both of which are standard sizes and can be replaced from our stock. **Each, $15.00**

5-015. CENTRIFUGE, Water Motor, Four 15 ml. Tubes. The same as No. 5-010 with all the features described under that number, but equipped with a head and **safety holders** for 4 tubes, 15 ml. Supplied with 4 aluminum shields, also two No. 5-500 plain and two No. 5-490 graduated 15 ml. glass tubes of standard size. Supplied with hose connection for smooth faucet. **Each, $18.00**

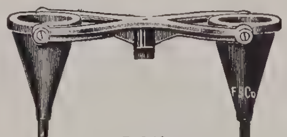
5-020. CENTRIFUGE, Water Motor, Two 50 ml. Tubes. Similar in every respect to No. 5-010 Centrifuge with all the features described under that number, except that the head, safety holders and shields are for two 50 ml. tubes. Supplied with one No. 5-530 plain and one No. 5-520 graduated 50 ml. tubes, both of standard size. Supplied with hose connection for smooth faucet. **Each, $17.50**

5-025. CENTRIFUGE, Water Motor, Four 50 ml. Tubes. The same as No. 5-010 with all the features described under that number, but equipped with a head and safety holders for four 50 ml. tubes.

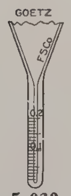
Supplied with 4 aluminum shields, also two No. 5-530 plain and two No. 5-520 graduated 50 ml. tubes, both of standard sizes. Supplied with hose connection for smooth faucet. **Each, $21.00**



5-030 5-035



5-040



5-030

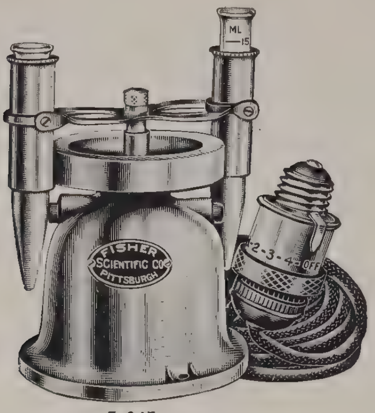
5-035

5-030. CENTRIFUGE, Water Power, Two Goetz Tubes. This is the same as Centrifuge No. 5-010 with all the features described under that number, but equipped with Head No. 5-040 and two Goetz Precipitation Tubes No. 5-625 which are pear-shaped, graduated to 100 ml. with the lower 0.2 ml. graduated in 0.01 ml. divisions.

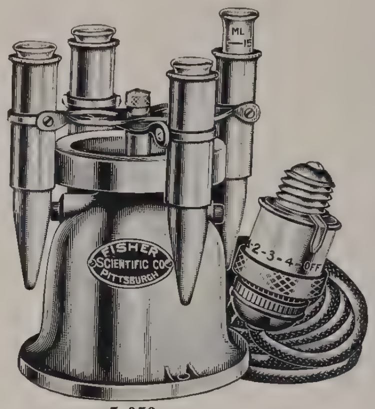
These tubes are used to measure the Phosphorus in iron and steel determinations, also in other determinations where a small amount of precipitation or sedimentation is to be accurately measured. Supplied with hose connection for smooth faucet. **Each, $23.00**

5-035. CENTRIFUGE, Water Power, Two A. S. T. M. (pear-shaped) **Oil Sedimentation Tubes.** Same as No. 5-030, but equipped with two A. S. T. M. Oil Sedimentation Tubes No. 5-615, graduated to 100 ml. with lower 3 ml. graduated in $^{1}/_{10}$ ml. Supplied with hose connection for smooth faucet. **Each, $22.50**

5-040. CENTRIFUGE HEAD. For two Pear-shaped Tubes. With two shields to take Tubes Nos. 5-625 or 5-615. Will fit the Hand Centrifuges and Water Motor Centrifuges listed. **Each, $7.50**



5-045



5-050

5-045. CENTRIFUGE, Electric, Shelton, Two 15 ml. Tubes. This centrifuge has been adopted after a study of the merits and service of different makes and designs. We recommend it for Medical, Pathological and Chemical laboratory work. It is low and compact and has a heavy gyroscopic balance wheel which causes the centrifuge to run smoothly and without side motion.

The motor is universal and will operate on any 110 volt lighting circuit, either A.C. or D.C.

The motor brushes are held firm by springs and are readily withdrawn to clean or replace by unscrewing two hard rubber screws on the outside of the housing.

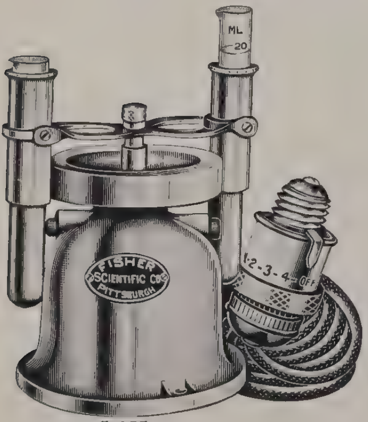
The entire centrifuge is finished in polished nickel.

The centrifuge is started or stopped and the speed controlled by a compact rheostat fitted into the plug which screws into the standard lighting socket; speeds from 500 to 2,500 r.p.m. can be attained.

Supplied with 2 aluminum shields, one No. 5-490 graduated 15 ml. tube and one No. 5-500 plain 15 ml. tube, both of which are standard and can be supplied from our stock. The speed control rheostat is also supplied.

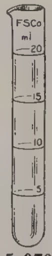
Furnished with rheostat and 10 feet of heavy connecting cord with plug; for 110 volts A.C. or D.C. **Each, $34.00**

5-050. CENTRIFUGE, Electric, Shelton, Four 15 ml. Tubes. This centrifuge is similar to No. 5-045 and has all the features described under that number, but is designed to carry four tubes 15 ml. It is supplied with a four-tube head, 4 aluminum shields; two No. 5-490 graduated 15 ml. tubes and two No. 5-500 plain 15 ml. tubes, both of which are standard. For 110 volts, A.C. or D.C. **Each, $42.00**



5-055
See also No. 5-060

5-065



5-070

5-075

5-055. CENTRIFUGE, Electric, Shelton, Two 20 ml. Myers Tubes. This centrifuge is the same as No. 5-045 and has all the features mentioned under that number, but is equipped with a head which carries two Myers Tube-Holders and two Myers Graduated Tubes No. 5-070.

Used for the determination of Sugar, Creatinine and Chlorides, (Method described in Myers—"*Chemical Analysis of Blood*";73(1924), also *Jour. Laby. & Clin. Medicine*,V;418(1920.) For 110 volts, A.C. or D.C. **Each, $36.00**

5-060. CENTRIFUGE HEAD, Four Myers Tubes. Can be attached to Centrifuge No. 5-045 and used for the determination of Sugar, Creatinine and Chlorides as referred to under No. 5-055. Price without metal shields or glass tubes. **Each, $10.00**

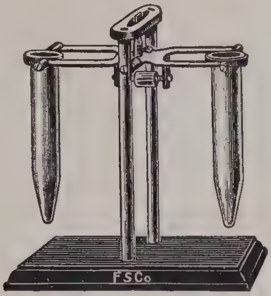
5-065. CENTRIFUGE METAL SHIELD. To fit Head No. 5-060 or the Head of No. 5-055 and carry Myers Tubes Nos. 5-070 or 5-075. **Each, $1.75**

5-070. CENTRIFUGE TUBE, Myers, Graduated. Made of glass, for use with Centrifuge No. 5-055 and Head No. 5-060; graduated at 5, 10, 15 and 20 ml.; with lip for pouring. **Each, $ .50**

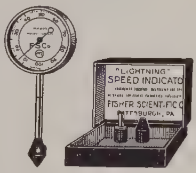
5-075. CENTRIFUGE TUBE, Myers, Plain. Similar to No. 5-070, but not graduated............**Each, $ .25**

5-080

5-085



5-090 5-095



5-100

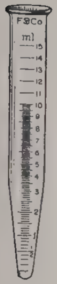
5-080. CENTRIFUGE TUBE SHIELD. For 15 ml. Tubes. Made of aluminum for use in our hand-power, water-power and Shelton Centrifuges. Takes our standard 15 ml. Centrifuge Tubes Nos. 5-490, 5-495, 5-500 and 5-505.
Each, $ .25
Per dozen, 10% discount

5-085. CENTRIFUGE TUBE SHIELD. For 50 ml. Tubes. Made of aluminum for use in the 50 ml. tube head of our water-power centrifuges. Takes our standard 50 ml. Centrifuge Tubes Nos. 5-520, 5-525, 5-530 and 5-535.
Each, $ .35

5-090. CENTRIFUGE TUBE BALANCE. For 15 ml. Tubes. Centrifuges will run without vibrations when in balance. This balance enables the user to select tubes of about the same weight or to fill tubes so that their weights are counterpoised. The balance is provided with the 15 ml. aluminum shield and has an adjusting weight for bringing the balance into equilibrium.
Each, $7.50

5-095. CENTRIFUGE TUBE BALANCE. For 50 ml. Tubes. Same as No. 5-090 but made to take 50 ml. tubes. Provided with 50 ml. aluminum shields.
Each, $10.00

5-100. CENTRIFUGE SPEED INDICATOR. With nickel-plated case and enameled dial which reads to 100 revolutions and is subdivided in single revolutions; an indicator on the dial registers each 100 revolutions up to 10. Provided with an extension stem and two rubber tips of different shapes for contact with the center of the revolving spindle; a roller for measuring linear speed is also supplied. Furnished in cloth-covered case.
Each, $2.75

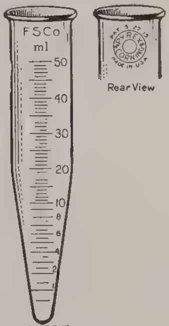


5-490

5-495

5-500

5-505



5-525
See also No. 5-520

5-535
See also No. 5-530

5-490. CENTRIFUGE TUBE, 15 ml. Graduated, conical bottom.................................**Each, $ .50**
Per dozen, 10% discount **Per gross,** 20% discount

5-495. CENTRIFUGE TUBE, Pyrex, 15 ml. Graduated. Pyrex better withstands sterilization. . . **Each, $ .80**
Carton of 48, 10% discount

5-500. CENTRIFUGE TUBE, 15 ml. Plain, similar to No. 5-490 but ungraduated.................**Each, $ .12**
Per dozen, 10% discount **Per gross,** 20% discount

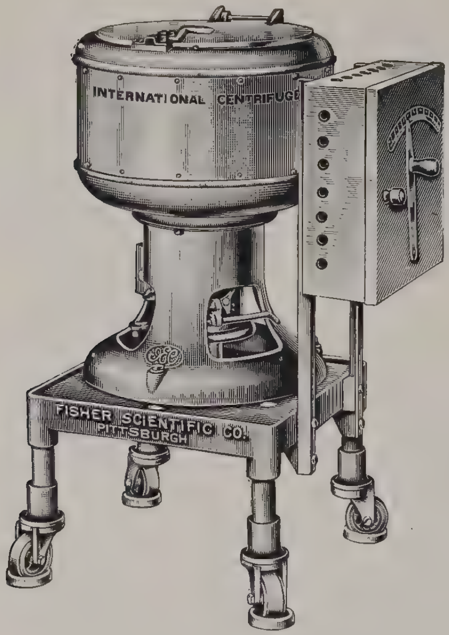
5-505. CENTRIFUGE TUBE, Pyrex, 15 ml. Plain, similar to No. 5-495, but ungraduated. Pyrex glass better withstands sterilization.
Each, $ .25
Carton of 48, 10% discount

5-520. CENTRIFUGE TUBE, 50 ml. Graduated, conical bottom..................... ....**Each, $ .75**
Per dozen, 10% discount **Per gross,** 20% discount

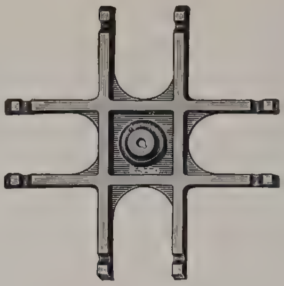
5-525. CENTRIFUGE TUBE, Pyrex, 50 ml. Graduated. Pyrex better withstands sterilization. **Each, $1.40**
Carton of 24, 10% discount

5-530. CENTRIFUGE TUBE, 50 ml. Plain, similar to No. 5-520, but ungraduated............ . . **Each, $ .30**
Per dozen, 10% discount **Per gross,** 20% discount

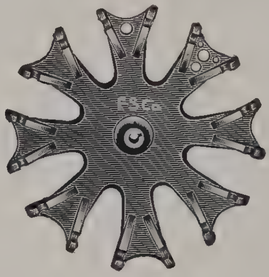
5-535. CENTRIFUGE TUBE, Pyrex, 50 ml. Plain, similar to No. 5-525, but ungraduated. Pyrex glass better withstands sterilization.
Each, $ .50
Carton of 24, 10% discount



5-110 5-115
See also No. 5-105



5-235
Supplied with Outfit 5-105
For description, see page 167



5-155
Supplied with Outfit 5-105
For description, see page 165

REGARDING INTERNATIONAL CENTRIFUGES AND ACCESSORIES

We have illustrated and completely described the three International Centrifuges most used in Chemical and Bacteriological laboratories.

Each of these centrifuges can be used for a large variety of purposes, so that the machine proper is a piece of universal laboratory equipment. Immediately after each centrifuge, we have illustrated the different Heads, Tubes, and Accessories from which a selection can be made to suit any particular work.

For Bacteriological Laboratories, we recommend a choice between Size 1 (Nos. 5-110 and 5-120) and Size 2 (No. 5-335) depending on the capacity required. Choice between Nos. 5-110 and 5-120 depending upon the speed required and the mechanical features of brake, brush-release and self-balancing, which No. 5-110 has, but No. 5-120 has not.

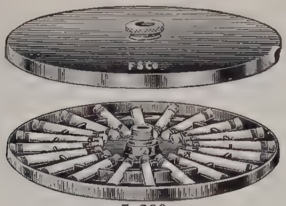
For routine Urinalysis and Wassermann's, No. 5-120 is satisfactory.

For Vaccine Preparation and Research Work, No. 5-110 is desirable, and is more convenient for Wassermann's.

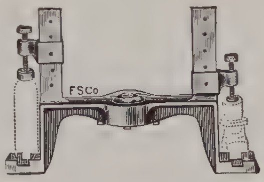
For Hospital Laboratories doing a **small** amount of routine work, Centrifuge No. 5-120 is satisfactory. Equipment for this may be: (1) No. 5-125; (1) No. 5-155; (8) No. 5-170; (8) No. 5-180; (8) No. 5-185; (8) No. 5-200 and suitable glass tubes. Where a **moderate** amount of routine, research and special work is done, we recommend No. 5-110 Centrifuge. Equipment suggested for this is: (1) No. 5-115; (1) No. 5-155; (8) No. 5-170; (8) No. 5-180; (8) No. 5-185; (1) No. 5-295; (1) No. 5-235; (4) No. 5-265; (8) No. 5-200 and suitable glass tubes. Where a **large** amount of routine and special work is done, we recommend No. 5-335 Centrifuge.

For Oil Testing, we recommend Centrifuge No. 5-335; (1) No. 5-340; (1) Head No. 5-140; (4) Cups No. 5-370; (4) Trunnion Rings No. 5-365; (8) Glass Tubes No. 5-605.

For Boards of Health doing a large number of Wassermann's and other routine work, we recommend No. 5-335 Centrifuge. For the Milk Inspection Department, we recommend the special centrifuge designed for this purpose, which will be found listed under Milk Testing Apparatus, on page 460, in this catalogue.



5-290
Supplied with Outfit 5-105
For description see page 168



5-295
Supplied with Outfit 5-105
For description see page 168

5-105. CENTRIFUGE EQUIPMENT. The following is a typical equipment for a Bacteriological laboratory:

1—Centrifuge No. 5-110A, with rheostat	**$166.50**	1—Shaker Head, No. 5-295	**$20.00**
1—Head No. 5-155	**14.40**	1—Head No. 5-235	**9.30**
8—Metal Cups No. 5-170	**6.00**	4—Metal Trunnion Cups, No. 5-265. .	**14.00**
8—Trunnion Rings, No. 5-180.........	**3.60**	1—Bd. of H. Disc. No. 5-290	**21.00**
12—Tubes, 50 ml. No. 5-545...........	**3.60**	100—Tubes, 2 ml. No. 5-655	**3.25**
8—Reducers for 15 ml. Tubes, No. 5-185	**1.20**	100—Stoppers for tubes, No. 5-660......	**3.90**
12—Tubes, 15 ml. No. 5-490............	**6.00**	**Total price** of above equipment . .	**$272.75**

5-110. CENTRIFUGE, International, Size 1-S B., Electric. A substantial and well built high-powered Centrifuge for general laboratory work, which can be equipped with the different heads, accessories, and tubes, listed hereafter, and used for a large variety of different purposes. This Centrifuge is being used with satisfaction for research and routine work in bacteriological, physiological, and chemical laboratories of Hospitals, Universities, Dairies and Health Departments.

Speed. The maximum speeds vary between 2000 r.p.m. and 4000 r.p.m. with corresponding maximum centrifugal forces of 600 x Gravity, and 2500 x Gravity, depending on the equipment used. Slower speeds are obtained by means of the Speed Control Rheostat.

Hand Break and Brush Release. The hand break enables the operator to slow the Centrifuge to the speed at which the tubes fall, and the brush release allows the machine to come to rest slowly, thereafter, thus preventing the stirring up of the precipitates.

Mechanical Features. The base is a rigid and substantial bell-shaped casting which serves as a housing for the motor, and is a strong support for the thrust bearing for the motor shaft. The heads are made of materials and dimensions suitable for the loads and speeds they sustain, and are accurately machined and balanced.

The mounting of this Centrifuge is flexible, making the centrifuge within reasonable limits, practically self-balancing.

The moving parts are surrounded with a protecting case made of iron and steel. This protects the centrifuge from damage, as well as the operator from accident.

The lubrication of the machine is efficient and easily accessible. The main shaft runs on a step ball-bearing immersed in oil, applied through a conveniently accessible oil cup. The upper bearing is a bronze bushing lubricated by suitable cup grease.

Size and Finish. The centrifuge stands 26 inches high over all when closed; the protecting case is 19 inches diameter; the lid is 15 inches diameter so that everything is easily accessible; the weight is 180 pounds; the shipping weight about 300 pounds. The outside finish is aluminum bronze, and the inside finish is white enamel paint.

Motor. The centrifuge is supplied with motor to suit the current available, and in ordering it is necessary to state whether the current is 110 volts or 220 volts, and whether alternating or direct. If alternating, state the number of cycles. The motor is not "universal," but at any time should it be desired to change the current, it can be readily reconnected by the user, for 110 volt D.C., 110 volt A.C., or 220 volt D.C., but the rheostat must be suitable to the voltage. The 220 volt D.C. motor cannot be so reconnected.

A Speed Control Rheostat is supplied, equipped with a lever for the convenient regulation of the speed as desired. This rheostat is completely enclosed and protected, and complies with the Underwriters' specifications; there is an indicating pointer on the outside of the case, by means of which the setting of the rheostat can always be observed.

(*Illustration shows No. 5-110 Centrifuge with its Rheostat, mounted on No. 5-115 Stand.*)

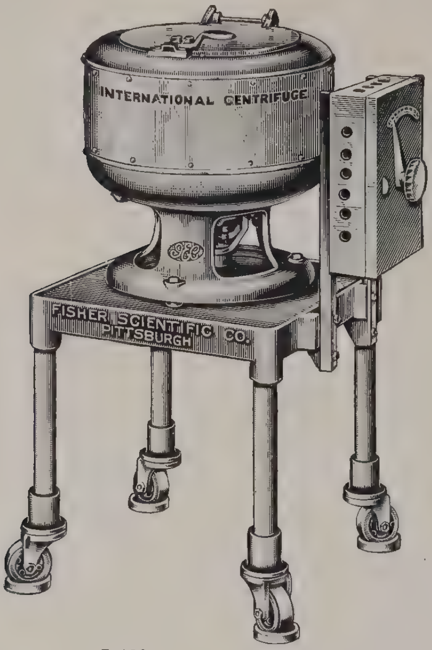
Price of No. 5-110 Centrifuge with enclosed speed-control Rheostat, without Heads, Tubes or Stand.

A-For 110 volts D.C..	**Each, $166.50**
B-For 110 volts A.C. (60 cycle)....................................	**166.50**
C-For 220 volts D.C..	**190.00**
D-For 220 volts A.C. (60 cycle)....................................	**166.50**

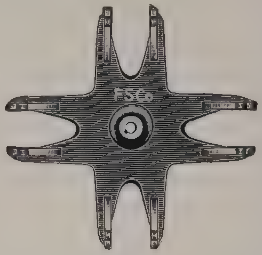
5-115. STAND, Vibrationless, with Electric Installation. For No. 5-110 Centrifuge. This stand absorbs practically all vibrations of the centrifuge; it is easily movable from place to place or from room to room; it brings the top of the centrifuge to a convenient working level; all electrical connections are enclosed in it; it has an angle-iron support for attaching the rheostat box; has detachable cord for connecting rheostat with motor; provided with 10 feet of cord and plug for attaching to wall receptacle; neatly finished in harmony with the centrifuge.

It is made entirely of metal; has four rubber-tired casters and is supplied with four rubber floor-saucers which cushion the casters. The wiring from stand to centrifuge motor is flexible, and is readily disconnected to allow the centrifuge to be dismounted.

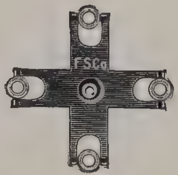
The stand is complete, ready to take No. 5-110 Centrifuge and its Rheostat (*as shown in the illustration*). **Each, $35.00**



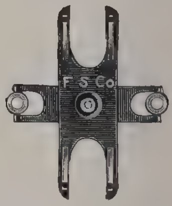
5-120 5-125



5-140



5-130



5-135

For 8-Place Heads, see page 165

5-120. CENTRIFUGE, International, Size 1-C, Electric. This centrifuge has been designed for smaller laboratories; it has the capacity and quality of No. 5-110 Centrifuge, but it does not have the power nor the Hand Break and Brush-release.

Speed. The maximum speeds vary between 1700 r.p.m. and 2300 r.p.m. with corresponding maximum centrifugal forces of 400 x Gravity, and 800 x Gravity, depending upon the equipment used. Slower speeds are obtained by means of the Speed Control Rheostat.

Mechanical Features are the same as the No. 5-110 Centrifuge, except that it does not have the self-balancing feature.

Size and Finish. The centrifuge stands 19 inches high over all when closed; the protecting case is 18 inches diameter; the lid is 12 inches diameter so that everything is easily accessible; the weight is 95 lbs., and the shipping weight about 150 lbs. The finish is aluminum bronze outside, and white enamel paint inside.

Motor. The centrifuge is supplied with either a 110 volt motor, or a 220 volt motor; in either case the motor will operate equally well, without any change, on alternating or direct current. In ordering state whether for 110 volt, or 220 volt current.

Speed Control Rheostat is enclosed in case, provided with lever and pointer inside.

(Illustration shows No. 5-120 Centrifuge with its Rheostat, mounted on No. 5-125 Stand.)

No. 5-120 Centrifuge with enclosed speed-control Rheostat, without Heads, Tubes or Stand. (State voltage in ordering.)

A-For 110 volts, A.C. or D.C.	**$100.00**
B-For 220 volts, A.C. or D.C.	**100.00**

5-125. STAND, Vibrationless, with Electric Installation. For No. 5-120 Centrifuge. This stand is similar to and has all the features of No. 5-115 Stand but it is the proper size and design to take No. 5-120 Centrifuge and its rheostat. **Each, $35.00**

ACCESSORIES FOR INTERNATIONAL CENTRIFUGES
Nos. 5-110 and 5-120

5-130. HEAD, Four 15 ml. Tube, Trunnion Rings attached. The attached rings take 4—No. 5-160 Metal Tubes, 15 ml., Cornell Type. **Head, without metal tubes, Each, $6.50**

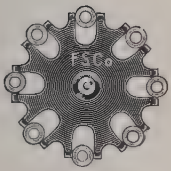
5-135. HEAD, Combination, Four Place, Two 15 ml. Trunnion Rings and Two 50 ml. Places. The attached rings take 2—No. 5-160 Metal Tubes, 15 ml., Cornell Type. The two larger places, called 50 ml. openings, take any of the following:

No. 5-170 Metal Tube, 50 ml., with No. 5-180 Trunnion Ring.
No. 5-190 Metal Tube, 15 ml., with No. 5-195 Triple Carrier.
No. 5-200 Trunnion Cup. **Head, without metal tubes, Each, $8.20**

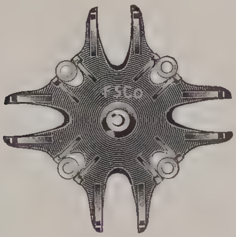
5-140. HEAD, Four 50 ml. Place. All of the places will accommodate any of the equipment listed under No. 5-135 Head, for the 50 ml. openings. **Head, without metal tubes, Each, $9.00**

ACCESSORIES FOR INTERNATIONAL CENTRIFUGES

Nos. 5-110 and 5-120

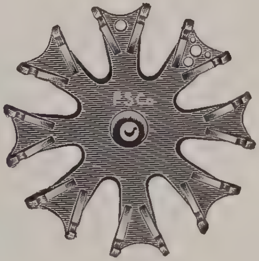


5-145



5-150

For 4-Place Heads, see page 164

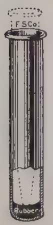


5-155

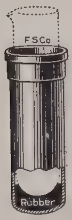
5-145. HEAD, Eight 15 ml. Tube, Trunnion Rings attached. The attached rings take 8—No. 5-160 Metal Tubes, 15 ml., Cornell Type. **Head, without metal tubes, Each, $12.00**

5-150. HEAD, Combination, Eight Place, Four 15 ml. Trunnion Rings and Four 50 ml. Places. The attached rings take 4—No. 5-160 Metal Tubes, 15 ml., Cornell Type. The four larger places, called 50 ml. openings, take any of the equipment listed under No. 5-135 Head, for the 50 ml. openings. **Head, without metal tubes, Each, $14.00**

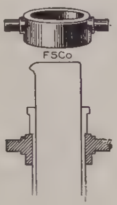
5-155. HEAD, Eight 50 ml. Place. All of the openings will accommodate any of the equipment listed under No. 5-135 Head, for the 50 ml. openings. **Head, without metal tubes, Each, $14.40**



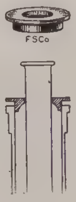
5-160



5-170



5-180



5-185

5-160. METAL TUBE, 15 ml., Cornell Type, supplied with No. 5-165 Rubber Cushion. This tube, without any other equipment, fits the attached Trunnion Rings in Heads No. 5-130, No. 5-145, No. 5-135 and No. 5-150. **Without glass tube, Each, $.60**

5-165. EXTRA RUBBER CUSHION. To replace the one supplied in No. 5-160 Metal Tube. **Per dozen, $.86**

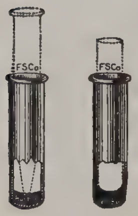
5-170. METAL TUBE, 50 ml., supplied with No. 5-175 Rubber Cushion. This tube, with No. 5-180 Trunnion Ring, fits the 50 ml. places in Heads No. 5-210, No. 5-140, No. 5-135, No. 5-150, No. 5-240 and No. 5-155. **Metal Tube with cushion,** without Trunnion Ring or glass tube, **Each, $.75**

5-175. EXTRA RUBBER CUSHION. To replace one supplied in No. 5-170 Tube. **Per dozen, $1.73**

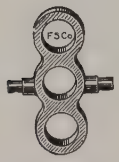
5-180. TRUNNION RING, For 50 ml. Tube. With this Trunnion Ring, No. 5-170 Metal Tube, 50 ml., can be fitted into the 50 ml. places in Heads No. 5-210, No. 5-140, No. 5-135, No. 5-150, No. 5-240 and No. 5-155. **Each, $.45**

5-185. REDUCING CAP; Holds 15 ml. Glass Tube in 50 ml. Metal Tube. This adapter fits No. 5-170 Metal Tube and holds any of the 15 ml. glass tubes. **Cap only, Each, $.15**

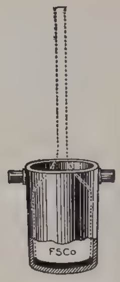
ACCESSORIES FOR INTERNATIONAL CENTRIFUGES
Nos. 5-110 and 5-120



5-190



5-195



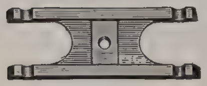
5-200

5-190. METAL TUBE, 10 ml., Agglutination Type, supplied with No. 5-165 Rubber Cushion. This metal tube holds No. 5-650 Agglutination Glass Tube or any standard 15 ml. glass tube. It is shorter than the No. 5-160 Cornell Type Tube and fits the No. 5-195 Carrier only. **Metal tube and cushion only, Each, $.55**

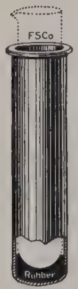
5-195. TRUNNION CARRIER, Triple, For 10 ml. Tubes. This carrier fits any 50 ml. place and is recommended for use with No. 5-155 Head and No. 5-190 Metal Tubes, to swing 24 glass tubes, 15 ml., at one time. Used by Insurance Companies and Institutions where a great amount of routine analysis is carried on; also used in agglutination work, with glass tube No. 5-650. **Carrier without tubes, Each, $.90**

5-200. BABCOCK TRUNNION CUP, with trunnions attached; made to fit 50 ml. places in Heads No. 5-210, No. 5-140, No. 5-135, No. 5-150, No. 5-240 and No. 5-155. This cup holds any standard 6-inch Babcock Test Bottle, also a round Sputum Bottle, No. 3-365. Furnished with No. 5-205 Rubber Cushion. **Cup with cushion, without bottle, Each, $.75**

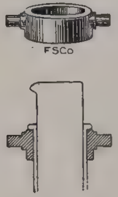
5-205. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-200 Cup. **Per dozen, $.66**



5-210



5-215



5-225

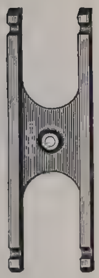
5-210. HEAD, Short, Two Place, 100 ml. This is a special head made extra short so that with No. 5-225 Trunnion Ring and No. 5-215 Metal Tube, the 100 ml. glass tube, No. 5-560, can be swung in the Nos. 5-110 and 5-120 Centrifuges. The openings will accommodate any of the equipment listed under No. 5-135 Head, for the 50 ml. places. **Head, without metal tubes, Each, $5.00**

5-215. METAL TUBE, 100 ml., supplied with No. 5-220 Rubber Cushion. With No. 5-225 Trunnion Ring, this tube fits in head, No. 5-210. Although the ring will fit any 50 ml. place, this tube is too long to swing in any head other than No. 5-210 in Nos. 5-110 or 5-120 Centrifuges. Used with glass tubes No. 5-560. **Metal tube and cushion only, Each, $.90**

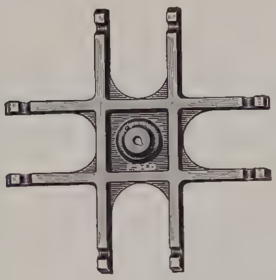
5-220. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-215 Metal Tube. **Per dozen, $2.39**

5-225 TRUNNION RING, 100 ml.; used with metal tube No. 5-215 to be carried in Head No. 5-210. **Each,$ .55**

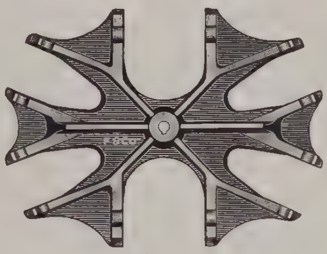
ACCESSORIES FOR INTERNATIONAL CENTRIFUGES
Nos. 5-110 AND 5-120



5-230



5-235



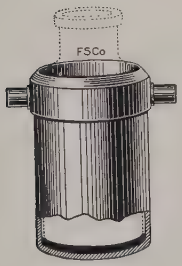
5-240

5-230. HEAD, Two Place, 250 ml. In this head will fit any of the following:

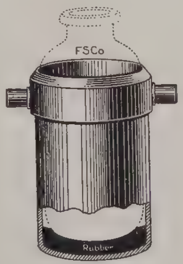
No. 5-245 Trunnion Cup, 250 ml.
No. 5-255 Trunnion Cup, 250 ml.
No. 5-265 Trunnion Cup, 6 oz.
No. 5-275 Trunnion Carrier, 150 ml., Squibb
No. 5-285 Trunnion Carrier, 100 ml., Goetz or A. S. T. M. .... **Head only, $7.50**

5-235. HEAD, Four Place, 250 ml. All of the openings will accommodate any of the equipment listed under No. 5-230 Head. **Head only, $9.30**

5-240. HEAD, Combination, Six Place, Four 50 ml. Places and Two 250 ml. Places. The 50 ml. places will accommodate any of the equipment listed under No. 5-135 Head for the 50 ml. openings. The 250 ml. places will accommodate any of the equipment listed under No. 5-230 Head. **Head only, $15.30**



5-245



5-255

5-245. TRUNNION CUP, 250 ml., supplied with No. 5-250 Rubber Cushion. This cup takes the standard, flat bottom, wide-mouth bottles, 250 ml. or 8 oz. The trunnions are attached to the cup and fit in Heads No. 5-240 (250 ml. openings), or No. 5-230 and No. 5-235. **Cup with cushion only, Each, $4.50**

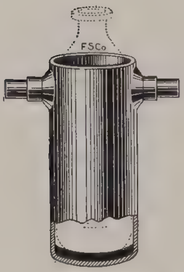
5-250. EXTRA RUBBER CUSHION, for No. 5-245 Cup .... **Each, $ .36**

5-255. TRUNNION CUP, 250 ml., supplied with No. 5-260 Rubber Cushion. This cup takes the round bottom, Sterilizer Bottle No. 5-580. The trunnions are attached to the cup and fit in Heads No. 5-240 (large openings), or No. 5-230 and No. 5-235. **Cup with cushion only, Each, $4.50**

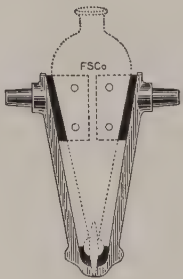
5-260. EXTRA RUBBER CUSHION, for No. 5-255 Cup .... **Each, $ .60**

ACCESSORIES FOR INTERNATIONAL CENTRIFUGES

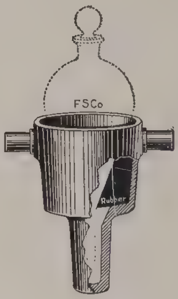
Nos. 5-110 AND 5-120



5-265



5-275



5-285

5-265. TRUNNION CUP, 6 ounce, supplied with No. 5-270 Rubber Cushion. This cup takes No. 5-595, 6 ounce graduated bottle. The trunnions are attached to the cup and fit Heads No. 5-240 (large openings), or No. 5-230 and No. 5-235. **Cup with cushion only, Each, $3.50**

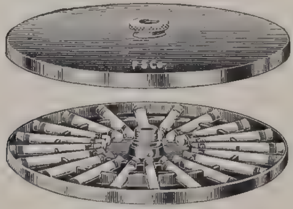
5-270. EXTRA RUBBER CUSHION, For No. 5-265 Cup.......................................**Each, $ .36**

5-275. TRUNNION CARRIER, For Squibb Funnel, supplied with No. 5-280 upper and lower Rubber Cushions. This carrier is specially designed to accommodate No. 5-570 Squibb Separatory Funnel, 150 ml., with a very short stem. The trunnions are attached to the cup and fit Heads No. 5-240 (250 ml. openings), or No. 5-230 and No. 5-235. **Carrier with cushions only, Each, $5.00**

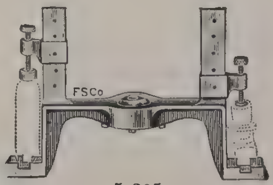
5-280. EXTRA RUBBER CUSHIONS, For No. 5-275 Squibb Carrier; upper and lower.........**Per pair, $1.20**

5-285. TRUNNION CARRIER, For Pear-shaped Tubes, supplied with No. 5-286 Rubber Cushion. This carrier is designed to take the standard Goetz Phosphorus Tubes, No. 5-625, or the pear-shaped A. S. T. M. Oil Tubes, No. 5-615. The trunnions are attached to the carrier and fit Heads No. 5-240 (large openings), or No. 5-230 and No. 5-235. **Carrier with cushion only, Each, $3.50**

5-286. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-285 Cup.............**Each, $ .90**



5-290



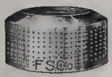
5-295

5-290. DISC HEAD, Board of Health. Made to accommodate 20—No. 5-655 Board of Health Glass Tubes, 2 ml. Supplied without glass tubes. **Each, $21.00**

5-295. SHAKER HEAD, 2 Bottle. The top supports for the bottles are adjustable for height so that it will take various small bottles and tubes of about 50 ml. capacity. It is interchangeable with the different other heads on Centrifuges, Nos. 5-110 and 5-120.

Produces a very vigorous shaking such as is needed with antigens, sputum, etc. It is used at slow speed of the centrifuge; about 1000 vibrations per minute. **Shaker Head without glassware, $20.00**

ACCESSORIES FOR INTERNATIONAL CENTRIFUGES, Nos. 5-110 AND 5-120



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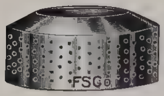

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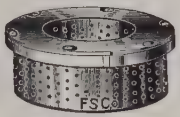

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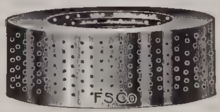

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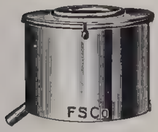

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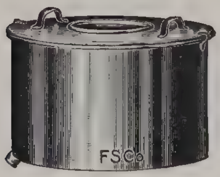


5-320

5-330

5-300. PERFORATED BASKET, Bronze, 5 inches diameter. Used with No. 5-305 Draining Chamber. Fits No. 5-110 and No. 5-120 Centrifuges. **Each, $18.00**

5-305. DRAINING CHAMBER, Nickeled Copper; used with No. 5-300 Perforated Basket. Designed to fit Centrifuges Nos. 5-110 and 5-120. **Each, $16.00**

5-310. PERFORATED BASKET, Bronze, 8 inches diameter. Used with No. 5-320 Draining Chamber. Fits No. 5-110 and No. 5-120 Centrifuges. **Each, $30.00**

5-315. PERFORATED BASKET, Bronze, 8 inches diameter, with removable flange top, exposing straight inside wall. Used with No. 5-320 Draining Chamber. Fits No. 5-110 and No. 5-120 Centrifuges. **Each, $55.00**

5-320. DRAINING CHAMBER, Nickeled Copper, used with No. 5-310 and No. 5-315 Perforated Baskets. Designed to fit Centrifuges Nos. 5-110 and 5-120. **Each, $18.00**

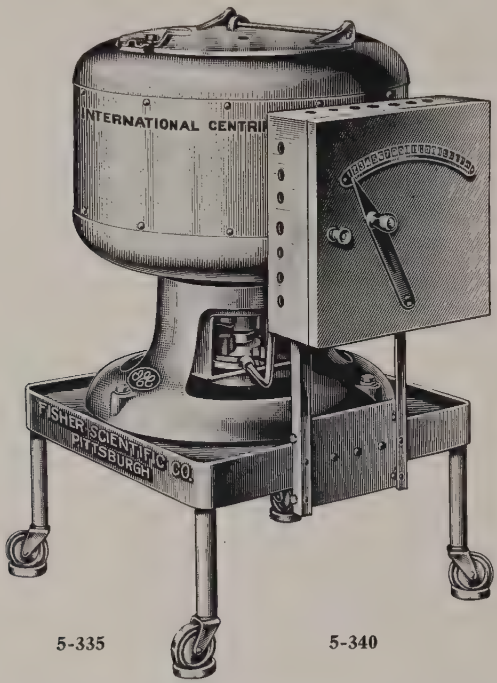
5-325. PERFORATED BASKET, Bronze, 11 inches diameter. Can be used in No. 5-110 Centrifuge, but **not** in No. 5-120. Used with No. 5-330 Draining Chamber. **Each, $45.00**

5-330. DRAINING CHAMBER, Copper, used with No. 5-325 Perforated Basket. Designed to fit Centrifuge No. 5-110. **Each, $20.00**

GLASSWARE FOR CENTRIFUGES

F. S. Co. Centrifuge Glassware, listed under Nos. 5-490 to 5-660 inclusive, has been standardized and made to fit the Metal Tubes and Trunnion Cups of the Centrifuges shown in this catalogue.

Special Centrifuge Glassware, with dimensions to fit other shields or metal holders, must be made to order, in which case a sketch with dimensions is necessary.



5-335 5-340

5-335. CENTRIFUGE, International Size 2, Electric. A substantial, high powered centrifuge, similar to No. 5-110 and used for all the purposes mentioned under that number, but of **larger capacity.** This centrifuge is recommended for Board of Health, Hospital, and Chemical laboratories where a large amount of routine work is done.

Speed. The maximum speeds vary between 2000 r.p.m. and 3800 r.p.m., with corresponding maximum centrifugal forces of 755 × Gravity, and 2250 × Gravity, depending on the equipment used. Slower speeds are obtained by means of the Speed Control Rheostat.

Hand Break and Brush-Release. The hand break enables the operator to slow the centrifuge to the speed at which the tubes fall, and the brush-release allows the machine to come to rest slowly thereafter, thus preventing the stirring up of the precipitates.

Mechanical Features. The base is a rigid and substantial bell shaped casting, similar in construction to the No. 5-110 Centrifuge, and serves the purpose mentioned under that number.

As the capacity of this machine is larger, the machine is built accordingly so that a corresponding strength and stability is preserved.

The heads are designed for the loads and speeds they sustain, and are accurately machined and balanced.

The main shaft runs on a ball bearing immersed in oil, and this is supplied by an oil cup on the side. The upper bronze bearing is lubricated by an efficient wick-oil-system.

Size and Finish. The centrifuge stands 29 inches high over all when closed; the protecting case is 24 inches diameter; the lid is 16 inches diameter; the weight of the machine is 260 lbs., and the shipping weight about 400 lbs.

The finish is aluminum bronze outside, and white enamel paint inside.

Motor. The motors for this centrifuge are designed and built especially for the duty required.

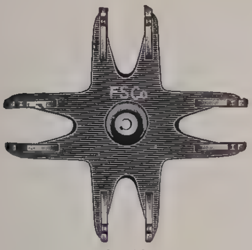
Different motors for four different currents can be supplied; 110 volt D.C.—220 volt D.C.—110 volt, 60 cycle A.C.—220 volt, 60 cycle A.C. In ordering state which of these currents is to be used.

Speed Control Rheostat supplied with the centrifuge is completely enclosed and has lever and indicator on the outside of the case. (Illustration shows No. 5-335 Centrifuge and its Rheostat, mounted on No. 5-340 Stand.)

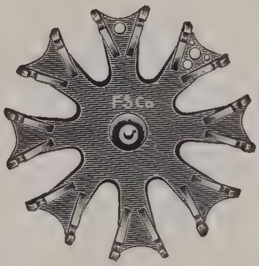
Price of No. 5-335 Centrifuge with enclosed speed-control Rheostat, without Heads, Tubes or Stand.
Each, $230.00

5-340. STAND, Vibrationless, with Electric Installation, For No. 5-335 Centrifuge. This stand absorbs practically all vibrations; it can be moved from place to place and it brings the top of the centrifuge to a convenient working height. It contains all electrical connections and has a support for attaching the enclosed rheostat supplied with the centrifuge. The casters have rubber tires, and four rubber floor-saucers cushion the casters. It is made entirely of metal, is finished in harmony with the centrifuge and is supplied with cord and plug for connecting to Lighting Circuit, all complete to take No. 5-335 Centrifuge and its Rheostat.
Each, $37.00

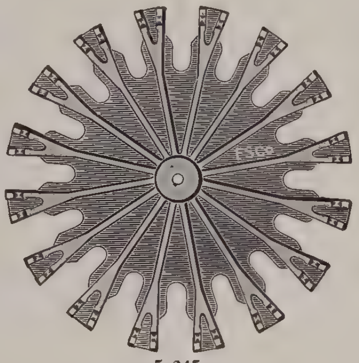
ACCESSORIES FOR INTERNATIONAL CENTRIFUGE No. 5-335



5-140



5-155

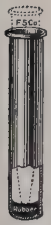


5-345

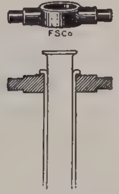
5-140. HEAD, Four 50 ml. Place. All of the places will accommodate any of the following equipment and swing in No. 5-335 Centrifuge.
No. 5-160 Metal Tube, 15 ml., with No. 5-350 Trunnion Ring
No. 5-170 Metal Tube, 50 ml., with No. 5-180 Trunnion Ring
No. 5-190 Metal Tube, 15 ml., with No. 5-195 Triple Carrier
No. 5-200 Trunnion Cup
No. 5-360 Babcock Metal Tube, with No. 5-365 Trunnion Ring
No. 5-215 Metal Tube, with No. 5-225 Trunnion Ring
No. 5-370 Metal Tube, with No. 5-365 Trunnion Ring **Head, without metal tubes, Each, $9.00**

5-155. HEAD, Eight 50 ml. Place. All of the places will accommodate any of the equipment listed under No. 5-140 Head and swing in No. 5-335 Centrifuge. **Head, without metal tubes, Each, $14.40**

5-345. HEAD, Sixteen 50 ml. Place. All of the places will accommodate any of the following equipment and swing in No. 5-335 Centrifuge.
No. 5-170 Metal Tube, 50 ml., with No. 5-180 Trunnion Ring
No. 5-190 Metal Tube, 15 ml., with No. 5-195 Triple Carrier
No. 5-200 Trunnion Cup
No. 5-365 Trunnion Cup
No. 5-355 Metal Tube, with No. 5-365 Trunnion Ring **Head, without metal tubes, Each, $29.00**



5-160



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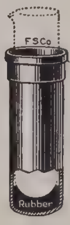
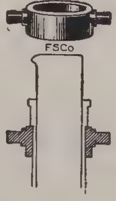
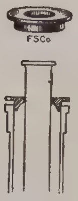


5-170



5-180



5-185

5-160. METAL TUBE, 15 ml., Cornell Type, supplied with No. 5-165 Rubber Cushion. With Trunnion Ring, No. 5-350, this tube swings in No. 5-140 and No. 5-155 Heads, but not No. 5-345 Head. **Without trunnion ring or glass tube, Each, $ .60**

5-165. EXTRA RUBBER CUSHION. To replace the one supplied with No. 5-160 Metal Tube. **Per dozen, $ .86**

5-350. TRUNNION RING, For 15 ml. Tube in 50 ml. Place. With this trunnion ring, No. 5-160 Metal Tubes 15 ml. will swing in No. 5-140 and No. 5-155 Heads, but not in No. 5-345 Head, when used in No. 5-335 Centrifuge. **Each, $ .75**

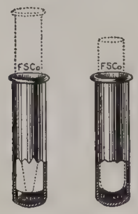
5-170. METAL TUBE, 50 ml., supplied with No. 5-175 Rubber Cushion. This tube, with No. 5-180 Trunnion Ring, fits the 50 ml. places in Heads No. 5-140, No. 5-155, No. 5-390 and No. 5-345. **Metal tube with cushion, without trunnion ring or glass tube, Each, $ .75**

5-175. EXTRA RUBBER CUSHION. To replace one supplied with No. 5-170 Metal Tube..... **Per dozen, $1.73**

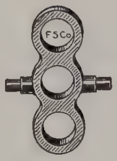
5-180. TRUNNION RING, For 50 ml. Tube. With this trunnion ring, No. 5-170 Metal Tube, 50 ml. can be fitted into the 50 ml. places in Heads No. 5-140, No. 5-155, No. 5-390 and No. 5-345. **Each, $ .45**

5-185. REDUCING CAP, Holds 15 ml. Glass Tube in 50 ml. Metal Tube. This adapter fits No. 5-170 Metal Tubes and holds any of the 15 ml. glass tubes. **Cap only, Each, $ .15**

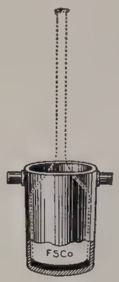
ACCESSORIES FOR INTERNATIONAL CENTRIFUGE No. 5-335



5-190
See also No. 5-165



5-195



5-200
See also No. 5-205

5-190. METAL TUBE, 10 ml. Agglutination Type, supplied with No. 5-165 Rubber Cushion. This metal tube holds No. 5-650 Agglutination Glass Tube, also the 15 ml. Glass Tubes Nos. 5-490, 5-495, 5-500 and 5-505. It fits in Carrier No. 5-195 only. **Metal tube and cushion only, Each, $ .55**

5-165. EXTRA RUBBER CUSHION. To replace one supplied with No. 5-190 Metal Tube. **Per dozen, $ .86**

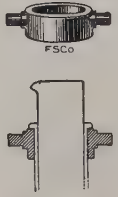
5-195. TRUNNION CARRIER, Triple, For No. 5-190 Metal Tubes. This carrier fits any 50 ml. place in Heads No. 5-140, No. 5-155, No. 5-390 and No. 5-345. Used by Insurance Companies and Institutions where a great amount of routine analysis is carried on, especially adapted for use with Heads No. 5-155 and No. 5-345. **Carrier without tubes, Each, $ .90**

5-200. BABCOCK TRUNNION CUP, with trunnions attached, **for 6 inch Bottles.** Made to fit 50 ml. places in Heads No. 5-140, No. 5-155, No. 5-390 and No. 5-345. This cup holds a standard 6 inch Babcock Milk Test Bottle, also round Sputum Bottle, No. 3-365. Furnished with No. 5-205 Rubber Cushion. **Cup with cushion only, Each, $ .75**

5-205. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-200 Cup........**Per dozen, $ .66**

5-355

5-360



5-365
5-225

5-215

5-370

5-355. BABCOCK METAL CUP, For 9 inch Bottles. Supplied with No. 5-205 Rubber Cushion. This tube, with Trunnion Ring No. 5-365 can be used in Head No. 5-345 only. **Each, $ .90**

5-360. BABCOCK METAL TUBE, For 9 inch Bottles. Supplied with No. 5-205 Rubber Cushion. This tube, with Trunnion Ring No. 5-365 can be used in Heads No. 5-140, No. 5-155 and No. 5-390. **Metal tube with cushion, Each, $1.00**

5-365. TRUNNION RING, For Nos. 5-355 and 5-360 Tubes. With this trunnion ring, No. 5-355 Metal Tube swings in Head No. 5-345; also used with Metal Tube No. 5-360 to swing in Heads No. 5-140, No. 5-155 and No. 5-390. It also takes No. 5-370 Tube (*See No. 5-370*). **Each, $ .65**

5-215. METAL TUBE, 100 ml., supplied with No. 5-220 Rubber Cushion. With Trunnion Ring No. 5-225, this tube will swing in the 50 ml. places in Heads No. 5-140, No. 5-155 and No. 5-390. **Metal tube with cushion only, Each, $ .90**

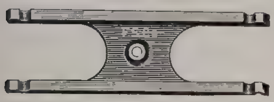
5-220. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-215 Metal Tube. **Per dozen, $2.39**

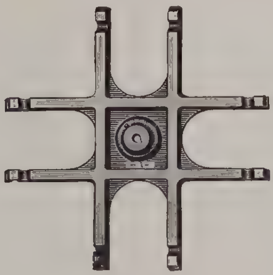
5-225. TRUNNION RING, 100 ml. With this ring, Metal Tube No. 5-215 will swing in the 50 ml. places in Heads No. 5-140, No. 5-155 and No. 5-390. (In No. 5-335 Centrifuge only, not in the other centrifuges.) **Each $ .55**

5-370. METAL TUBE, 100 ml., A. S. T. M. Long, supplied with No. 5-375 Rubber Cushion. With No. 5-365 Trunnion Ring, this tube fits in Heads No. 5-140, No. 5-155 and No. 5-390. (In No. 5-335 Centrifuge only.) **Metal tube with cushion only, Each, $1.50**

5-375. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-370 Metal Tube. **Each, $ .72**

ACCESSORIES FOR INTERNATIONAL CENTRIFUGE No. 5-335


5-380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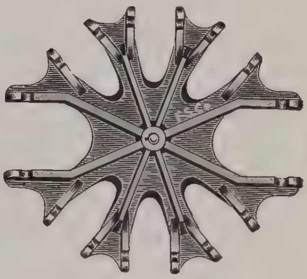
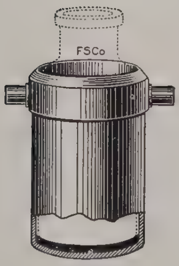

5-390

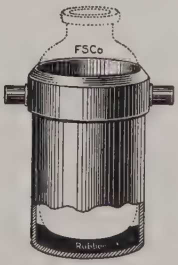
5-380. HEAD, Two Place, 250 ml. Both of the openings will accommodate any of the following equipment:
No. 5-245 and No. 5-255 Trunnion Cups
No. 5-275 Trunnion Carrier, 150 ml., Squibb
No. 5-285 Trunnion Carrier, 100 ml., pear-shape
No. 5-265 Trunnion Cup, 6 oz.
No. 5-395 Trunnion Cup, 8 oz. .... **Head only, $8.75**

5-385. HEAD, Four Place, 250 ml. All of the openings will accommodate any of the equipment listed under Head No. 5-380. **Head only, $15.00**

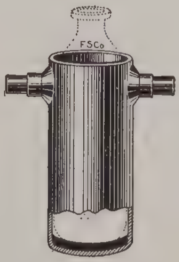
5-390. HEAD, Combination, Eight Place, Six 50 ml. and Two 250 ml. Places. The 50 ml. places will accommodate any of the equipment listed under Head No. 5-140. The 250 ml. places will accommodate any of the equipment listed under Head No. 5-380. **Head only, $16.00**



5-245



5-255



5-265

5-245. TRUNNION CUP, 250 ml., supplied with No. 5-250 Rubber Cushion. This cup takes the No. 5-590 flat bottom, wide-mouth, Glass Bottles, 250 ml. or 8 oz. The trunnions are attached to the cup and fit in Head No. 5-380 and the smaller openings of Head No. 5-400; also Head No. 5-385 and the larger openings of Head No. 5-390. **Cup with cushion only, $4.50**

5-250. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-245 Cup............. **Each, $ .36**

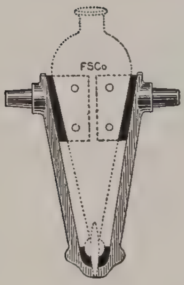
5-255. TRUNNION CUP, 250 ml., supplied with No. 5-260 Rubber cushion. This cup takes the No. 5-580, Sterilizer Bottle, 250 ml. The trunnions are attached to the cup and fit in Head No. 5-380, and the smaller openings of Head No. 5-400; also Head No. 5-385 and the larger openings of Head No. 5-390. **Cup with cushion only, $4.50**

5-260. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-255 Cup.............. **Each, $ .60**

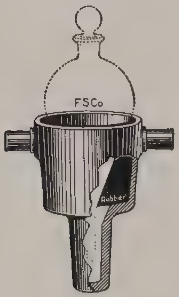
5-265. TRUNNION CUP, 6 ounce, supplied with No. 5-270 Rubber Cushion. This cup takes the 6 ounce Graduated Bottle, No. 5-595. The trunnions are attached to the cup and fit Heads No. 5-380, also No. 5-400 Head (smaller openings); No. 5-385, also 5-390 (larger openings). **Cup with cushion only, Each, $3.50**

5-270. EXTRA RUBBER CUSHION. To replace cushion supplied with No. 5-265 Cup..... .... **Each, $ .36**

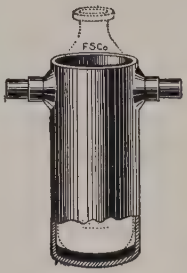
ACCESSORIES FOR INTERNATIONAL CENTRIFUGE No. 5-335



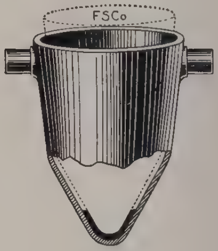
5-275



5-285



5-395



5-405

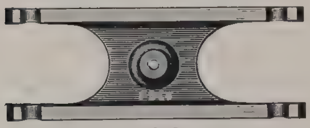
5-275. TRUNNION CARRIER, for Squibb Funnel, supplied with No. 5-280 Rubber Cushion. This carrier is specially designed to accommodate No. 5-570 Squibb Separatory Funnel, with a very short stem. The trunnions are attached to the carrier and fit Heads No. 5-380, No. 5-400 (smaller openings), No. 5-385 and No. 5-390 (larger openings). **Each, $5.00**

5-280. EXTRA RUBBER CUSHIONS. For No. 5-275 Squibb Carrier; upper and lower.......**Per pair, $1.20**

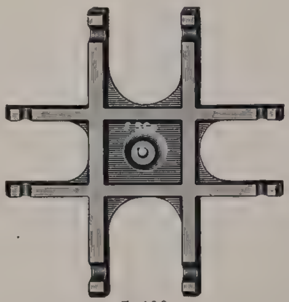
5-285. TRUNNION CARRIER, For Pear-Shaped Tubes, supplied with No. 5-286 Rubber Cushion. This carrier is designed to fit the standard Goetz Phosphorus Tubes No. 5-625, or the pear-shaped A. S. T. M. Oil Tubes No. 5-615. The trunnions are attached to the carrier and fit in Heads No. 5-380 and the smaller openings of Head No. 5-400; also Head No. 5-385 and the larger openings of Head No. 5-390.
Carrier with cushion, Each, $3.50

5-286. EXTRA RUBBER CUSHION to replace cushion supplied with No. 5-285 Cup...... ....**Each, $ .90**

5-395. METAL CUP, 8 ounce, supplied with No. 5-270 Rubber Cushion. This cup takes the 8 ounce Graduated Bottle, No. 5-595, or the tall form Oil Sample Bottle, 8 ounce, No. 5-600. **Each, $4.20**



5-398



5-400

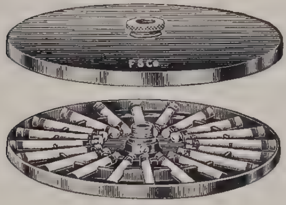
5-398. HEAD, Two Place, For Wide Conical Cups. Both of the openings will accommodate the extra wide Conical Metal Cups, No. 5-405. **Head only, $11.00**

5-400. HEAD, Combination, Four Place, with Two 250 ml. Places and Two Places for wide Conical Cups. The 250 ml. places will accommodate any of the equipment listed under Head No. 5-380. The "wide conical places" are somewhat larger and will accommodate only Conical Metal Cup No. 5-405.
Head only, $22.00

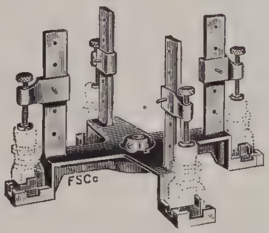
5-405. TRUNNION CUP, Wide Conical (250 ml.) supplied with No. 5-410 Rubber Cushion. The trunnions are attached to the cup and, because of their extra width, will swing only in Head No. 5-398 and in the larger openings of Head No. 5-400. **Cup with cushion only, Each, $4.05**

5-410. EXTRA RUBBER CUSHION. To replace the cushion supplied with No. 5-405 Cup.....**Per dozen, $3.60**

ACCESSORIES FOR INTERNATIONAL CENTRIFUGE No. 5-335



5-290



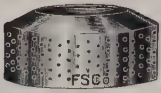
5-415

5-290. DISC HEAD, Board of Health; made to accommodate 20—No. 5-655 Board of Health Glass Tubes, 2 ml. Supplied without glass tubes. **Each, $21.00**

5-415. SHAKER HEAD, 4 Bottle. The top supports for the bottles are adjustable for height so that it will take various small bottles and tubes of about 50 ml. capacity. It is interchangeable with the different other heads on Centrifuge No. 5-335.

Produces a very vigorous shaking such as is needed with antigens, sputum, etc. It is used at slow speed of the centrifuge; about 1000 vibrations per minute. **Shaker head, without glassware, $28.00**

5-300



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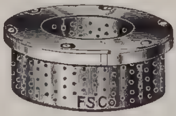

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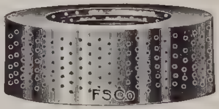


5-325

5-416

5-417

5-418

5-300. PERFORATED BASKET, Bronze, 5 inches diameter. Used with No. 5-416 Draining Chamber in Centrifuge No. 5-335. **Each, $18.00**

5-416. DRAINING CHAMBER, Nickeled Copper; used with No. 5-300 Perforated Basket in Centrifuge No. 5-335. **Each, $16.00**

5-310. PERFORATED BASKET, Bronze, 8 inches diameter. Used with No. 5-417 Draining Chamber in No. 5-335 Centrifuge. **Each, $30.00**

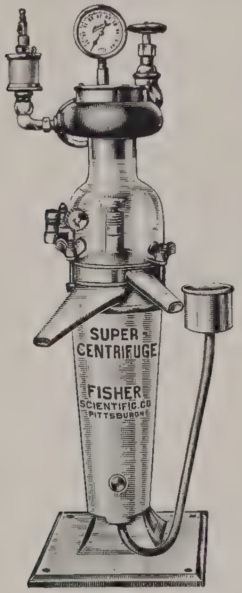
5-315. PERFORATED BASKET, Bronze, 8 inches diameter. With removable flange top, exposing straight inside wall. Used with No. 5-417 Draining Chamber in No. 5-335 Centrifuge. **Each, $55.00**

5-417. DRAINING CHAMBER, Nickeled Copper; used with No. 5-310 and No. 5-315 Perforated Baskets in No. 5-335 Centrifuge. **Each, $18.00**

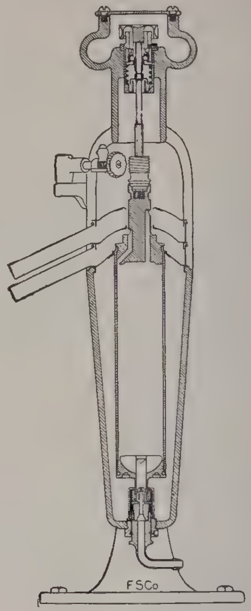
5-325. PERFORATED BASKET, Bronze, 11 inches diameter. Used with No. 5-418 Draining Chamber in No. 5-335 Centrifuge. **Each, $45.00**

5-418. DRAINING CHAMBER, Copper; used with No. 5-325 Perforated Basket. Designed to fit Centrifuge No. 5-335. **Each, $20.00**

LABORATORY SUPER-CENTRIFUGE



5-420
See also No. 5-425



Cross-section of
No. 5-420

PRINCIPLE OF THE SUPER-CENTRIFUGE

The super-centrifuge is different from the usual type centrifuge in which the liquid is placed in separate containers and swung about the axis; it is also different from the basket centrifuge in which the material is placed in a basket, rotated and separated by forcing a portion through the small perforations.

In this centrifuge a vertical tube of small diameter is rotated at a very high speed (40,000 r.p.m.), thereby generating a centrifugal force (41,250 × Gravity) which is much greater than is possible with other types.

The centrifugal force varies directly with the radius, but it varies as the square of the number of revolutions; so that a much greater force is developed in the small tube rotated at a very high speed. With the Super-Centrifuge the action can be made continuous.

SEPARATION BY GRAVITY and BY SUPER-CENTRIFUGE

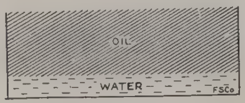


Fig. 1

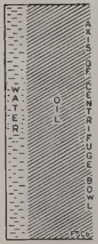


Fig. 2

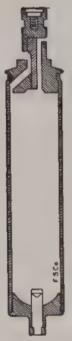
Fig. 1 shows a trough containing water and oil in which the force of gravity has caused separation, with a layer of oil on the top.

Fig. 2 shows the trough standing on end and the same separation made by centrifugal force, and represents one-half of the cross section of the Super-Centrifuge bowl.

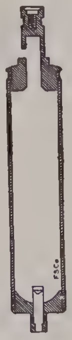
By bringing the supply in at the bottom and taking the liquids off at two different points at the top, the operation is continuous and each liquid flows from the centrifuge in a separate stream. The **No. 5-440 Separator Bowl,** with two outlets, is used for the separation of two immiscible liquids.

The **No. 5-450 Clarifier Bowl** has but one outlet, and that comes from near the center of the bowl. This is convenient for clarifying liquids, and can be used for continuous operation, but the centrifuge must be stopped at intervals and the solids taken from the sides of the bowl. Small amounts of liquid can be clarified by using the **No. 5-460 Batch Bowl,** in which the solid materials will pack against the sides.

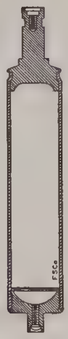
Any of these three bowls can be used with any of the Super-Centrifuges listed.



5-440 **5-445**



5-450 **5-455**



5-460 **5-465**

APPLICATION OF THE SUPER-CENTRIFUGE

The efficiency and the application of the Super-Centrifuge to a large number of various laboratory and commercial problems and operations are matters which we believe are not fully appreciated. It would be impossible to enumerate all of the uses to which the Super-Centrifuge is now being applied, but some of the general uses mentioned below will suggest its application to particular operations. Some applications of the Super-Centrifuge are:

Pathological Work
- Clarification of Agar-Agar
- Clarification of Gelatine
- Sedimentation of Bacteria
    - from Water
    - from Emulsions
    - from Serums
- Preparation of Serums
- Clarification of Albumens

The Resolution of Emulsions
- Vegetable Oils from Soap Stock
- Crude Petroleum Emulsions
- Wool Grease from Scouring Liquors
- Water Gas Tar Emulsions

Dehydration of Liquids
- Essential Oils
- Mineral Oils
- Vegetable and Animal Fats and Oils

Fractional Separations
- Paint Analysis
- Clay Analysis
- Enamels
- Citrus Fruit Juices

Colloidal Applications
- Precipitation of Sols
- Preparation of Uniform Suspensions
- Clarification of liquids difficult to filter

Clarification of Liquids
- Apple Jelley Stock
- Colloidal Suspensions
- Essential Oils
- Fruit Juices
- Lacquers
- Mineral Oils
- Pharmaceutical Extracts
- Shellac
- Varnishes

5-420. SUPER-CENTRIFUGE, Standard Laboratory Model, Turbine Drive.

This is the model for general laboratory work; it is driven by a turbine requiring 22 lbs. of steam or compressed air, at which pressure it will operate at the maximum speed of 40,000 r.p.m.

Any one of the three bowls shown may be used in this centrifuge; the principle and the application of it is described above, and the cross-section illustration (Page 176) shows the details of construction.

The liquid to be centrifuged is passed through the bowl, either by starting a syphon or by loosening a pinchcock on a rubber tube connected with an elevated supply can. After about 300 ml. of liquid has entered the bowl, the liquid discharges from the top of the bowl into compartments (called covers). The liquid then flows from the covers into any convenient receptacle. If a mixture of two liquids is being centrifuged, the separated liquids discharge into separate covers and thence to containers.

Small quantities of solids can be collected by using the No. 5-460 Batch Bowl, or Clarifier Bowl No. 5-450 can be used, in which case one of the outlet-covers is removed.

Capacity. The machine can be operated at various r.p.m. and the materials can be put through it at various rates; by regulating these two variables, any desired separation can be accomplished.

The "capacity" is rated in milliliters per minute. This varies, as a separation difficult to make will require that the liquid pass slowly through the bowl, while easy separations can be accomplished at a high rate. A few specific capacities of the Laboratory Super-Centrifuge are as follows:

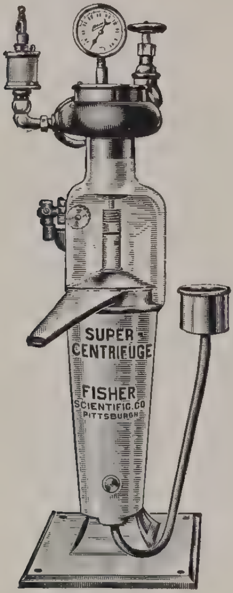
Colloidal carbon from used lubricating oil	50 ml. per minute
Complete clarification of any varnish	100 ml. per minute
Oil from a dilute soap-water emulsion	200 ml. per minute
Precipitated wax from chilled crude petroleum	500 ml. per minute
Moisture from crude petroleum emulsions	1000 ml. per minute

Construction. The base, the bowl housing and the turbine-bearing housing are cast in one piece; the parts coming in contact with the liquid are heavily tinned; the outside is finished in green enamel. A gauge indicates the steam (or air) pressure in the turbine, and a speed indicator indicates the number of revolutions of the bowl. The bowl is as nearly "in balance" as can be made, and the supporting and controlling elements are designed to completely absorb vibrations.

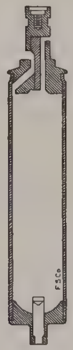
Centrifuge is 24 inches high and weighs 50 lbs.; the base is 10½ by 8 inches; the bowl is 2 inches diameter and holds 300 ml. Supplied with tinned-steel Separator Bowl No. 5-440. **Each, $200.00**

5-425. SUPER-CENTRIFUGE. Motor Drive, Standard Laboratory Model. This centrifuge is like No. 5-420 except that it is driven by an electric motor instead of a turbine, and is supplied with the motor. *In ordering, state voltage and current.* **Each, $250.00**

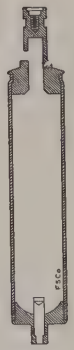
LABORATORY SUPER-CENTRIFUGE



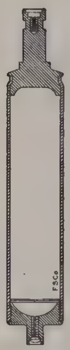
5-430
See also 5-435



5-440
5-445



5-450
5-455



5-460
5-465

5-430. SUPER-CENTRIFUGE, Medical Laboratory Model, Turbine Drive. This centrifuge is similar to No. 5-420 except that all parts coming in contact with the liquid are nickel-plated and can be readily sterilized; the outside is finished in white enamel paint.

It is used in the preparation of vaccines, antitoxines and other pathological products, and is also used for research work and for clarifying agar, gelatine, broth and other culture media.

No. 5-445 Separator Bowl can be used and can be supplied with this centrifuge, if desired.

The No. 5-465 Batch Bowl can be used for centrifuging small quantities and collecting the solids which adhere to the sides of the bowl.

Supplied with nickel-plated Clarifier Bowl No. 5-455. **Each, $215.00**

5-435. SUPER-CENTRIFUGE. Motor Drive, Medical Laboratory Model. This centrifuge is like No. 5-430 except that it is driven by an electric motor instead of a turbine and is supplied with the motor. It is supplied with the No. 5-455 Clarifier Bowl. *In ordering, state voltage and current.* **Each, $270.00**

5-440. BOWL, Separator, for Super-Centrifuge. With two outlets; 2 inches diameter; capacity 300 ml.; made of steel, **heavily tinned.** Used with the Nos. 5-420 or 5-430 Centrifuges. Used to separate two immiscible liquids. Each outlet connects with one of the discharge covers of the centrifuge. **Each, $45.00**

5-445. BOWL, Separator, for Super-Centrifuge. Two outlets; similar to No. 5-440 except **nickel-plated.** **Each, $50.00**

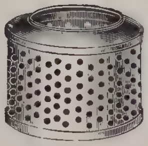
5-450. BOWL, Clarifier, for Super-Centrifuge. With one outlet; 2 inches diameter; capacity 300 ml.; made of steel, **heavily tinned.** Used with either No. 5-420 or No. 5-430 Centrifuge. This bowl is primarily intended to be used for the clarification of samples of a single liquid containing suspended matter that is heavier than the liquid being clarified. After a quantity of approximately 200 ml. of the removed material accumulates in the bowl, the bowl is removed and cleaned. **Each, $45.00**

5-455. BOWL, Clarifier, for Super-Centrifuge. One outlet; similar to No. 5-450 except **nickel-plated.** **Each, $50.00**

5-460. BOWL, Batch, for Super-Centrifuge. Not used for continuous feed. The bottom of this bowl is removed, about 250 ml. or less of the liquid inserted and the bottom replaced. It is placed in the Super-Centrifuge and run as long as the separation requires. After being removed, the liquid is drained by removing a plug in the bottom; the bowl is then opened and the deposited solid matter scraped from the sides of the bowl.

It is recommended for paint analysis where it is desired to recover a clear vehicle for analyzing and for other work of a similar nature, where it is desired to effect the rapid and complete separation of a small amount of suspension into its liquid and solid components. Used with either No. 5-420 or No. 5-430 Centrifuge. Made of steel, **heavily tinned.** **Each, $45.00**

5-465. BOWL, Batch, for Super-Centrifuge. Similar to No. 5-460 but **nickel-plated**............**Each, $50.00**



5-470
See also No. 5-475

5-470. CENTRIFUGE, Wayte, 6 inch Basket, Electric. It has a speed of 5000 r.p.m. and will, therefore, make separations not possible at the lower speeds.

The perforated basket is made of solid bronze and is 6 inches diameter.

Used for drying crystals, dehydrating sediments, pulps and other materials. It is very useful for laboratory experiments in connection with materials which are to be separated from their mother liquids on a commercial scale, as in sugar refineries, coal by-product plants, food products, drugs and chemical manufacturing. It can be used for continuous operation.

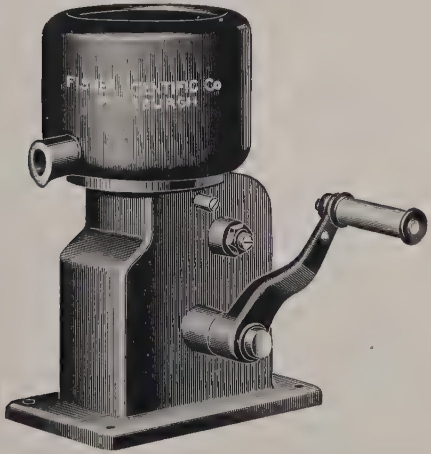
The motor is direct connected, and is mounted in a substantial base which can be screwed to the table or other stand.

These motors are made for either 110 volts or 220 volts, and are universal in that they will operate on either alternating or direct current.

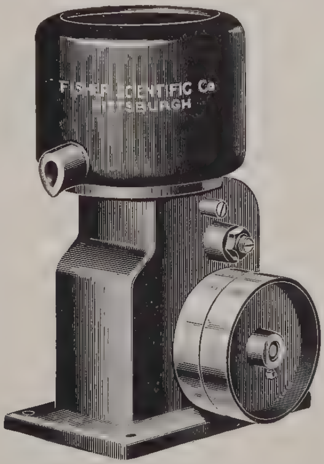
In ordering, state whether 110 volt or 220 volt or current is to be used. **Discontinued**

5-475. CENTRIFUGE, Wayte, 8 inch Basket, Electric. This centrifuge is similar to No. 5-470, but has a larger capacity; the solid bronze perforated basket is 8 inches diameter.

In ordering, state whether 110 volt or 220 volt current is to be used. **Discontinued**



5-480



5-485

5-480. CENTRIFUGE, Wayte, 4½ inch Basket, Hand Power. Used for the same purposes mentioned under No. 5-470.

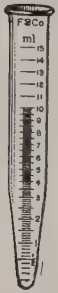
The centrifuge is substantially built; the gears are accurately cut which insures easy running, and are enclosed in the heavy base which is dust-proof. The perforated basket is made of solid bronze and is 4½ inches diameter; the handle is strong and large enough for easy manipulation.

Speed. 20 turns of the handle per minute produces 3000 r.p.m. of the basket; the speed can be accelerated to 30 turns of the handle per minute. **Each, $90.00**

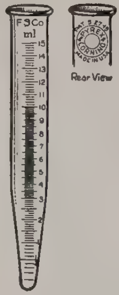
5-485. CENTRIFUGE, Wayte, 4½ inch Basket, Belt Drive. This centrifuge is the same as No. 5-480 except that it has tight and loose pulleys for belt drive. Each pulley is 4½ inches diameter and has a 1 inch face for flat belt.

It is used for continuous operation for the same work mentioned under No. 5-470. **Each, $100.00**

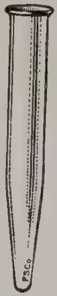
Centrifuge Glassware



5-490



5-495



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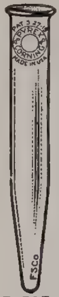
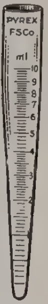
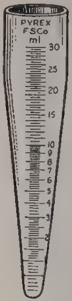


5-505



5-510



5-515

5-490. CENTRIFUGE TUBE, 15 ml. Graduated, conical at the bottom. Graduated to 10 ml. in 1/10 ml. and from 10 ml. to 15 ml. in 1 ml. divisions. The dimensions of this tube have been standardized, and it fits the 15 ml. metal shields of all the different centrifuges described on the previous pages of this catalogue. **Each, $ .50**
Per dozen, 10% discount **Per gross,** 20% discount

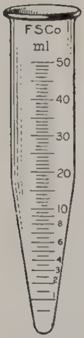
5-495. CENTRIFUGE TUBE, Pyrex, 15 ml. Graduated, conical at the bottom. Graduated to 10 ml. in 1/10 ml. and from 10 ml. to 15 ml. in 1/5 ml. Pyrex glass better withstands sterilization; fits the 15 ml. shields of the different centrifuges listed. **Each, $. 80**
Carton of 48, 10% discount

5-500. CENTRIFUGE TUBE, 15 ml. Plain. Same shape and size as No. 5-490 but not graduated. **Each, $ .12**
Per dozen, 10% discount **Per gross,** 20% discount

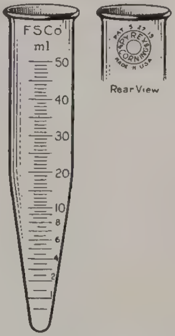
5-505. CENTRIFUGE TUBE, Pyrex, 15 ml. Plain. The same shape and size as No. 5-495 but not graduated. **Each, $ .25**
Carton of 48, 10% discount

5-510. CENTRIFUGE TUBE, 10 ml. Graduated, Pyrex, Wassermann. This is a special tube for washing blood for Wassermann tests and measuring the washed cells. It is graduated to 4 ml. in 1/10 ml. divisions and from 4 to 10 ml. in 1/5 ml. divisions. Used in the 50 ml. Metal Tube No. 5-170 with Reducer Cap No. 5-185. It also fits in No. 5-160 metal tube. **Each, $1.40**
Per dozen, 10% discount

5-515. CENTRIFUGE TUBE, 30 ml. Graduated, Pyrex, Wassermann. This is a special tube for washing blood for Wassermann tests and measuring the washed cells. It is graduated to 3 ml. in 1/10 ml. divisions, from 3 to 10 ml. in 1/5 ml. divisions, and from 10 to 30 ml. in ½ ml. divisions. It fits in No. 5-170 Metal Tube. **Each, $1.60**
Per dozen, 10% discount



5-520



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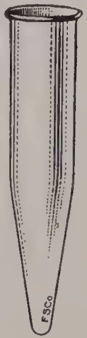

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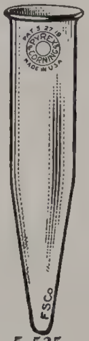
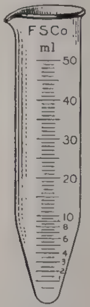


5-535



5-540

5-520. CENTRIFUGE TUBE, 50 ml. Graduated, conical at the bottom. Graduated to 10 ml. in ½ ml. and from 10 to 50 ml. in 1 ml. divisions. The dimensions of this tube have been standardized and it fits the 50 ml. metal shields of all the different centrifuges described on the previous pages. **Each, $ .75**
Per dozen, 10% discount **Per gross,** 20% discount

5-525. CENTRIFUGE TUBE, Pyrex, 50 ml. Graduated, same as No. 5-520 but made of Pyrex glass which better withstands sterilization. **Each, $1.40**
Carton of 24, 10% discount

5-530. CENTRIFUGE TUBE, 50 ml. Plain. Same shape and size as No. 5-520 but not graduated. **Each, $ .30**
Per dozen, 10% discount **Per gross,** 20% discount

5-535. CENTRIFUGE TUBE, Pyrex, 50 ml. Plain. The same shape and size as No. 5-525 but not graduated. **Each, $ .50**
Carton of 24, 10% discount

5-540. CENTRIFUGE TUBE, 50 ml. Graduated, Short Conical Bottom, with lip for pouring. Graduated to 10 ml. in ½ ml. divisions and from 10 to 50 ml. in 1 ml. divisions. Fits Metal Tube No. 5-170. **Each, $. 75**
Per dozen, 10% discount

5-545

5-550

5-555

5-560

5-565

5-545. CENTRIFUGE TUBE, 50 ml., Plain, Round Bottom, with lip for pouring. Fits Metal Tube No. 5-170.
Each, $ .30
Per dozen, 10% discount

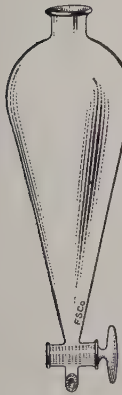
5-550. CENTRIFUGE TUBE, Pyrex, 50 ml., Plain, Round Bottom, with lip for pouring. Pyrex glass is well adapted to withstand sterilization. Fits Metal Tube No. 5-170.
Each, $ .50

5-555. CENTRIFUGE TUBE, 50 ml., Plain, with Neck. This tube has a round bottom and a neck contracted sufficiently for convenient stoppering. Fits Metal Tube No. 5-170.
Each, $ .35
Per dozen, 10% discount

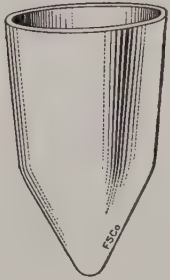
5-560. CENTRIFUGE TUBE, 100 ml., Plain, Round Bottom, with lip for pouring. Fits Metal Tube No. 5-215.
Each, $ .35
Per dozen, 10% discount

5-565. CENTRIFUGE TUBE, Pyrex, 100 ml., Round Bottom, with lip for pouring. Same as No. 5-560 but made of Pyrex glass.
Each, $ .50

CENTRIFUGE TUBES, Myers, graduated and plain. Illustrated and described under Nos. 5-070 and 5-075.



5-570



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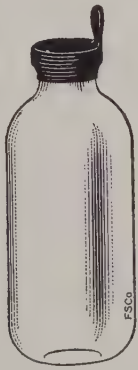
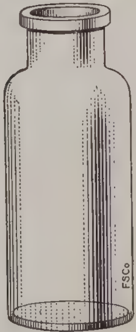


5-580 5-585



5-590

5-570. SQUIBB SEPARATORY FUNNEL. Capacity, 150 ml. Made especially for swinging in Centrifuge Trunnion Carrier No. 5-275, and used for oil or other tests where the bottom portion is drawn off.
Each, $2.50

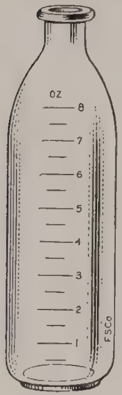
5-575. PRESSED GLASS CUP, 250 ml. capacity. Used in Centrifuge Trunnion Carrier No. 5-405. **Each, $1.85**

5-580. STERILIZER BOTTLE, 250 ml. capacity. Used in Centrifuge Trunnion Carrier No. 5-255 with Rubber Cushion No. 5-260. Without rubber cap.
Per dozen, $3.00

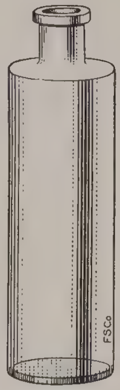
5-585. RUBBER CAP. For use with No. 5-580 Sterilizer Bottle.............................**Per dozen, $3.30**

5-590. BOTTLE, Wide Mouth, 250 ml. capacity. Used in Centrifuge Trunnion Cup No. 5-245 with Rubber Cushion No. 5-250.
Per dozen, $1.75

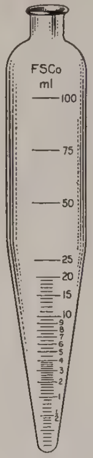
Centrifuge Glassware



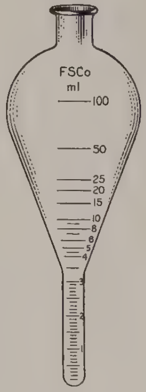
5-595



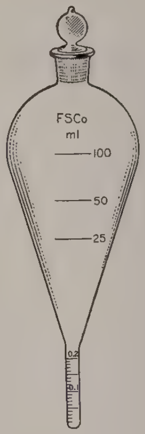
5-600



5-605 5-610



5-615 5-620



5-625

5-595. BOTTLES, Graduated. The 6 oz. size is used in Trunnion Cup No. 5-265 with Rubber Cushion No. 5-270 and the 8 oz. size is used in Trunnion Cup No. 5-395 with Rubber Cushion No. 5-270. The graduations are pressed in the glass and are convenient for approximate measuring.

Capacity, ounces	6	8
Per dozen	**$1.25**	**$1.50**

5-600. BOTTLE, Oil, 8 oz. Standard oil sample bottle, 8 oz. capacity; used in Centrifuge Trunnion Carrier No. 5-395. **Per dozen, $1.75**

BOTTLE, Sputum, Square, used in Shaker Heads. Illustrated and described under No. 3-355.

BOTTLE, Sputum, Round, used in Shaker Heads or in Trunnion Cup No. 5-200. Illustrated and described under No. 3-365.

5-605. OIL TUBE, A.S.T.M. Long Form. Adopted by the American Society for Testing Materials and used for determining precipitation, also water and sediment in oil for Standard Method 1924, Serial Designation D 96-24, also Tentative Method 1924, Serial Designation D 91-21T. The tube has a total capacity of about 125 ml. and is graduated to 100 ml. The first ½ ml. is subdivided in 1/20 ml.; from ½ to 1 ml. subdivided in 1/10 ml.; from 1 to 4 ml. subdivided in 1/5 ml.; from 4 to 10 ml. subdivided in ½ ml.; from 10 to 20 ml. subdivided in 1 ml. then graduated at 25, 50, 75 and 100 ml. Total length, 200 mm. Used in Centrifuge Metal Tube No. 5-370. **Each, $1.50**
Per dozen, 10% discount

5-610. OIL TUBE, A.S.T.M. Pyrex, Long Form. Similar to No. 5-605. Made of Pyrex glass. **Each, $2.50**
Carton of 24, 10% discount

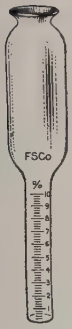
5-615. OIL TUBE, A.S.T.M. Pear-Shape. Adopted by the American Society for Testing Materials and used for determining precipitation, also water and sediment in oil for Standard Method 1924, Serial Designation D 96-24, also Tentative Method 1924, Serial Designation D 91-24T.

Total capacity about 125 ml.; graduated to 100 ml. The lower stem is graduated to 3 ml. in 1/10 ml. divisions; from 3 to 5 ml. in ½ ml. divisions; from 5 to 10 ml. in 1 ml. divisions; from 10 to 25 ml. in 5 ml. divisions; a graduation at 50 ml. and one at 100 ml. Used in Centrifuge Trunnion Carrier No. 5-285. **Each, $1.80**
Per dozen, 10% discount

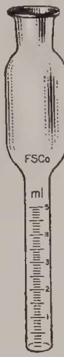
5-620. OIL TUBE, A.S.T.M. Pyrex, Pear-Shape. Same as No. 5-615 but made of Pyrex glass. **Each, $2.00**
Carton of 24, 10% discount

5-625. GOETZ PHOSPHORUS TUBE, Glass Stoppered. The lower stem of this tube is capillary and is graduated to 0.2 ml. in 0.01 ml. divisions; it is also graduated at 25, 50 and 100 ml.

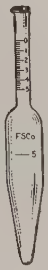
Used to measure the phospho-molybdate precipitate in phosphorus determinations in iron and steel, or in any other determination where a small amount of precipitate is to be accurately measured. It can be used with or without the glass stopper. Used in Centrifuge Trunnion Carrier No. 5-285. **Each, $1.80**
Per dozen, 10% discount



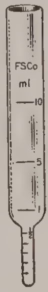
5-630



5-635



5-640



5-645

5-650

5-655
5-660

5-630. HART CASEIN TUBE. Total capacity about 35 ml.; lower portion graduated to 5 ml. (marked 10), subdivided in 1/5 divisions; each small division represents 2/10 of one per cent casein when a 5 ml. sample is used. For method, see Farrington and Woll, "*Testing Milk and its Products,*" *page 211-1924.* Fits Metal Tube No. 5-170. **Each, $ .75**
Per dozen, 10% discount

5-635. HORTVET TUBE. For the Analysis of Sugar, Syrups and Saccharine Products by the lead subacetate method.

Recommended by U. S. Bureau of Chemistry in Bulletin No. 107, Revised. The stem is graduated to 5 ml. in 1/10 ml. divisions. Upper portion has an etched label for marking. Used in Centrifuge Metal Tube No. 5-215. **Each, $ 1.00**

5-640. BABCOCK TUBE, for human milk. Each division on the stem represents 1/5 of one per cent fat, using 5 ml. of milk. Used in Centrifuge Metal Tube, 15 ml. No. 302 or in Metal Tube No. 5-170 with Reducer Cap No. 5-185, also the shield of our Centrifuges Nos. 5-000, 5-010 and 5-045. **Each, $ .45**
Per dozen, 10% discount

5-645. HOPKINS VACCINE TUBE. Used for the convenient Standardization of Vaccines. See *Jour. Amer. Med. Assoc., May 24, 1913.* The stem is capillary and is graduated in 0.1 ml. divisions to 0.5 ml.; it is also graduated at 1, 5 and 10 ml. Used in Centrifuge Metal Tube, 15 ml. No. 5-160. **Each, $ .60**
Per dozen, 10% discount

5-650. AGGLUTINATION TUBE, 10 ml. Used in Centrifuge Metal Tube No. 5-190 with Triple Carrier No. 5-195 **Per dozen, $ .50**

5-655. BOARD OF HEALTH TUBE, capacity about 2 ml. ungraduated, open at both ends; used with Rubber Stoppers, No. 5-660. Twenty of these tubes are carried in Board of Health Disc, No. 5-290.
Supplied, without rubber stoppers, Per hundred, $3.25

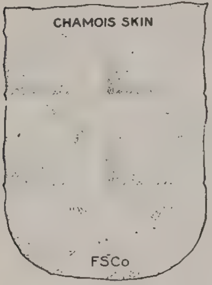
5-660. RUBBER STOPPERS, for Board of Health Tube, No. 5-655. Two of these stoppers are required for each glass tube. **Supplied, without glass tubes, Per hundred, $3.90**

GLASSWARE FOR CENTRIFUGES

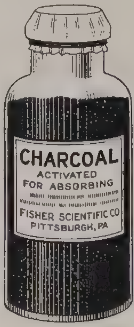
F. S. Co. Centrifuge Glassware, listed under Nos. 5-490 to 5-660 inclusive, has been standardized and made to fit the Metal Tubes and Trunnion Cups of the Centrifuges shown in this catalogue.

Special Centrifuge Glassware, with dimensions to fit other shields or metal holders, must be made to order, in which case a sketch with dimensions is necessary and the regular catalogue prices do not apply.

Chamois

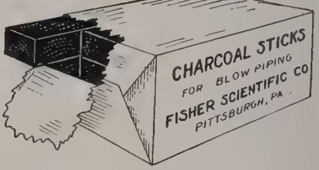


5-680



5-685

5-690



2-735

5-680. CHAMOIS SKINS, selected quality, suitable for filtering mercury, gasoline, etc. Also used for cleaning glassware and instruments.

Size	A	B
Dimensions, inches	10x13	14x18
Each	$ .40	.95

Per dozen, 10% discount.

5-685. CHARCOAL, Activated, for absorbing, 6 to 14 mesh; used in the recovery of light oils, solvents, etc., from natural gas, still gases, vapor lines, etc. This is a very coarse, dense, hard charcoal and is recommended for the recovery of gasoline, benzol, ether, alcohol, etc. This charcoal is specially prepared for absorption purposes only and is not recommended for decolorizing. (For decolorizing charcoal, see No. 5-690.)

In one pound, glass bottles. (Inclusive) **Per pound, $1.30**
In 4 lb. cans **Per pound, $1.15**

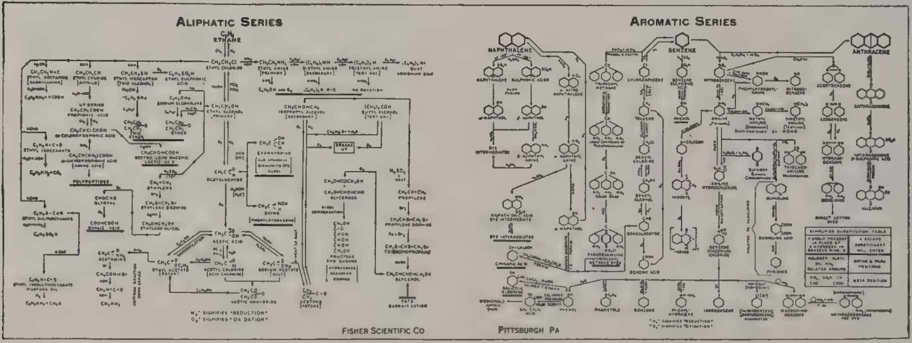
5-690. CHARCOAL, Activated, for decolorizing, less than 80 mesh; used for decolorizing oils, colored solutions, syrups, pharmaceuticals, etc. This charcoal is very hard and close grained. It is prepared so as to give the maximum clarifying power. It is finely ground, all under 80 mesh, exposing a maximum absorbing surface, without clogging the pores of the filter, when it is separated from the decolorized oil, etc. This activated charcoal is recommended for decolorizing purposes only and should not be confused with activated charcoal for absorbing No. 5-685, which is used for the removal of light oils from vapors.

In one pound, glass bottles. (Inclusive) **Per pound, $ .85**
In 4 lb. cans **Per pound, $ .70**

CHARCOAL, Powdered. See Reagent List in the rear of this catalogue.

2-735. CHARCOAL STICKS, Willow, kiln burned; used principally in blowpipe and flame analysis. Each stick measures about 20x25x100 mm. and is put up in packages of one dozen sticks.

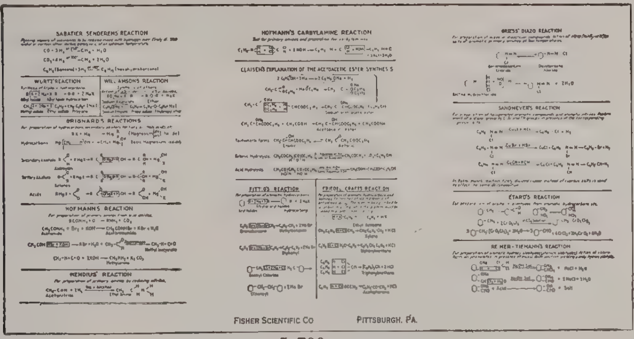
Per dozen (1 package) $ .95
Per gross (12 packages), 15% discount



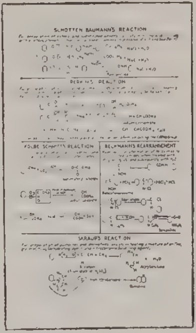
5-695

5-695. CHART, Organic Chemical Transformations, Bigelow and Boyes, Folder Size. This chart shows the organic chemical transformations, aliphatic and aromatic series. The reactions are all graphically represented, with the name of the substance printed alongside of the type formula, giving the complete history of the reaction at a glance.

This chart is particularly useful in acquainting the student with the fundamentals of organic chemistry. It is printed in black on heavy white paper, 22x8½ inches, and can be cut into two sections to be folded and pasted in the usual size of textbook. **Each, $ .25**
Per dozen, 20% discount



5-700

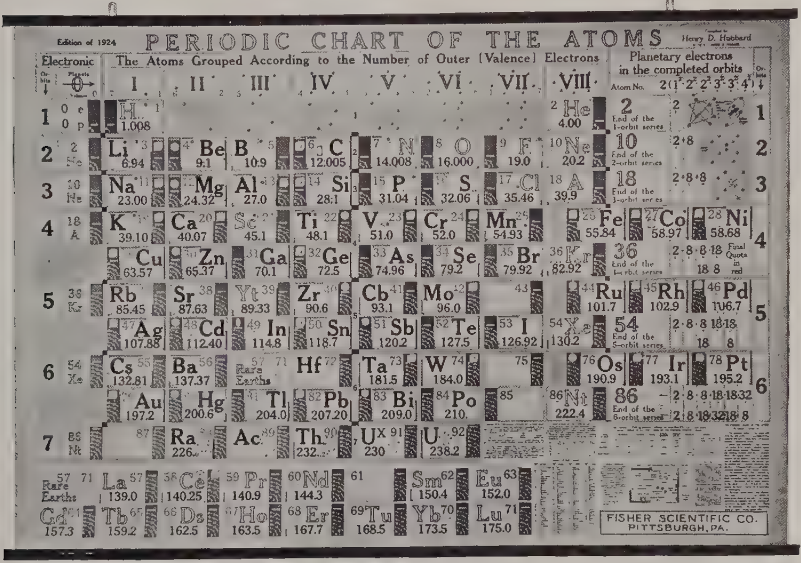


Page 4 of Chart

5-700. CHART, Organic Type Reactions, Lowy, Folder Size. The organic type reactions are classified according to the originators' names. The radicals, taking part in the reactions, are graphically printed in red so as to emphasize the subordinate part played by them. The side chains, alcoholic groups, etc., are printed in black and thus emphasize the variations occurring within them, as the reaction proceeds. The chart covers all of the ordinary reactions besides many which, while not in daily use, are basic in their application.

This folder is recommended as an aid in teaching the fundamental organic reactions to students, because it serves as a handy reference table for any organic textbook. It is printed in black and red on heavy white paper, 16x8½ inches, and folded in three sections. The fourth page of the chart is printed on the back of the sheet and is readily accessible when the chart is folded or pasted in the textbook. **Each, $ .15**

Per dozen, $1.20



Edition of 1924 PERIODIC CHART OF THE ATOMS Henry D. Hubbard

Electronic Orbits	Planets	I	II	III	IV	V	VI	VII	VIII			Planetary electrons in the completed orbits Atom No.	2(1²·2²·2²·3²·3²·4²)	Orbits
1	0 e 0 p	H 1 1.008							He 2 4.00			2 End of the 1-orbit series	2	1
2	2 He	Li 3 6.94	Be 4 9.1	B 5 10.9	C 6 12.005	N 7 14.008	O 8 16.000	F 9 19.0	Ne 10 20.2			10 End of the 2-orbit series	2+8	2
3	10 Ne	Na 11 23.00	Mg 12 24.32	Al 13 27.0	Si 14 28.1	P 15 31.04	S 16 32.06	Cl 17 35.46	A 18 39.9			18 End of the 3-orbit series	2+8+8	3
4	18 A	K 19 39.10	Ca 20 40.07	Sc 21 45.1	Ti 22 48.1	V 23 51.0	Cr 24 52.0	Mn 25 54.93	Fe 26 55.84	Co 27 58.97	Ni 28 58.68			4
		Cu 63.57	Zn 30 65.37	Ga 31 70.1	Ge 32 72.5	As 33 74.96	Se 34 79.2	Br 35 79.92	Kr 36 82.92			36 End of the 4-orbit series	2·8·8·18 18 8	Final Quota in red
5	36 Kr	Rb 85.45	Sr 38 87.63	Yt 39 89.33	Zr 40 90.6	Cb 41 93.1	Mo 42 96.0	43	Ru 44 101.7	Rh 45 102.9	Pd 46 106.7			5
		Ag 47 107.88	Cd 48 112.40	In 49 114.8	Sn 50 118.7	Sb 51 120.2	Te 52 127.5	I 53 126.92	Xe 54 130.2			54 End of the 5-orbit series	2·8·8 18·18 18 8	
6	54 Xe	Cs 55 132.81	Ba 56 137.37	57 71 Rare Earths	Hf 72	Ta 73 181.5	W 74 184.0	75	Os 76 190.9	Ir 77 193.1	Pt 78 195.2			6
		Au 197.2	Hg 200.6	Tl 204.0	Pb 82 207.20	Bi 83 209.0	Po 84 210.	85	Nt 86 222.4			86 End of the 6-orbit series	2·8·8·18·18·32 2 8 18 32 18 8	
7	86 Nt	87	Ra 226.	Ac 89	Th 90 232.	Ux 91 230	U 92 238.2							

Rare Earths 57 71	La 57 139.0	Ce 58 140.25	Pr 59 140.9	Nd 60 144.3	61	Sm 62 150.4	Eu 63 152.0
Gd 64 157.3	Tb 65 159.2	Ds 66 162.5	Ho 67 163.5	Er 68 167.7	Tu 69 168.5	Yb 70 173.5	Lu 71 175.0

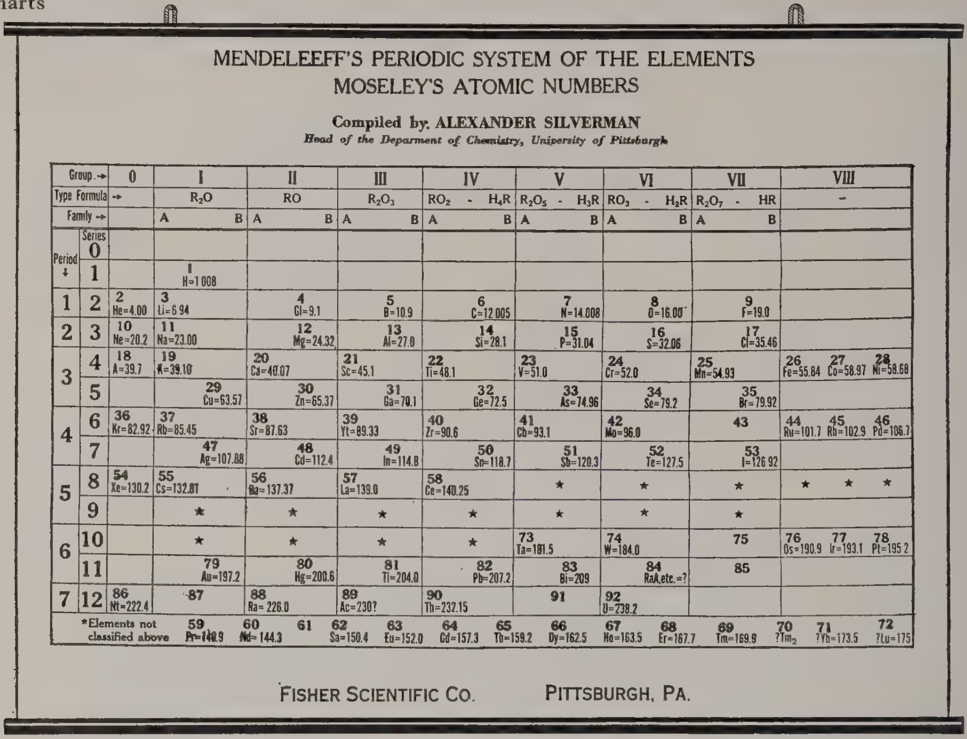
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

5-705

5-705. CHART, Periodic System, Hubbard, Wall Size, compiled by Henry D. Hubbard, U. S. Bureau of Standards, Washington, D. C. This is a complete chart showing thirty-six (36) different fundamental properties and characteristics of the atoms. It vividly portrays the newest data on the nature, structure, behavior and life-history of the atom, giving the complete story of the Periodic System at a glance. Among the properties and characteristics shown are:

- Atomic Name
- Atomic Symbol
- Atomic Weight
- Atomic Number
- Atomic Radius
- Atomic Cubic Structure
- Atomic Number Formula
- Specific Heats
- Valence
- Boiling Point
- Melting Point
- Compressibility
- Density
- Crystal Type
- Expansivity
- Resonance
- Isotopes
- Diamagnetism
- Paramagnetism
- Electropositiveness
- Electronegativeness
- Ionization Potential
- Resonance Potential
- Radioactive Explosive Series
- Orbit Transitions of Electrons

The chart is printed on heavy coated paper, with linen back, lithographed in six colors. It is 58 inches wide by 42 inches high, mounted on double split rollers, top and bottom, and supplied with a twenty-four (24) page key. **Each, $5.00**



MENDELEEFF'S PERIODIC SYSTEM OF THE ELEMENTS
MOSELEY'S ATOMIC NUMBERS

Compiled by. ALEXANDER SILVERMAN
Head of the Deparment of Chemistry, University of Pittsburgh

Group.→		0	I	II	III	IV	V	VI	VII	VIII
Type Formula		→	R_2O	RO	R_2O_3	RO_2 - H_4R	R_2O_5 - H_3R	RO_3 - H_2R	R_2O_7 - HR	-
Family →			A B	A B	A B	A B	A B	A B	A B	
Period ↓	Series 0									
	1		1 H=1 008							
1	2	2 He=4.00	3 Li=6.94	4 Gl=9.1	5 B=10.9	6 C=12 005	7 N=14.008	8 O=16.00	9 F=19.0	
2	3	10 Ne=20.2	11 Na=23.00	12 Mg=24.32	13 Al=27.0	14 Si=28.1	15 P=31.04	16 S=32.06	17 Cl=35.46	
3	4	18 A=39.7	19 K=39.10	20 Ca=40.07	21 Sc=45.1	22 Ti=48.1	23 V=51.0	24 Cr=52.0	25 Mn=54.93	26 Fe=55.84 27 Co=58.97 28 Ni=58.68
	5		29 Cu=63.57	30 Zn=65.37	31 Ga=70.1	32 Ge=72.5	33 As=74.96	34 Se=79.2	35 Br=79.92	
4	6	36 Kr=82.92	37 Rb=85.45	38 Sr=87.63	39 Yt=89.33	40 Zr=90.6	41 Cb=93.1	42 Mo=96.0	43	44 Ru=101.7 45 Rh=102.9 46 Pd=106.7
	7		47 Ag=107.88	48 Cd=112.4	49 In=114.8	50 Sn=118.7	51 Sb=120.3	52 Te=127.5	53 I=126 92	
5	8	54 Xe=130.2	55 Cs=132.81	56 Ba=137.37	57 La=139.0	58 Ce=140.25	★	★	★	★ ★ ★
	9		★	★	★	★	★	★	★	
6	10		★	★	★	★	73 Ta=181.5	74 W=184.0	75	76 Os=190.9 77 Ir=193.1 78 Pt=195 2
	11		79 Au=197.2	80 Hg=200.6	81 Tl=204.0	82 Pb=207.2	83 Bi=209	84 RaA,etc.=?	85	
7	12	86 Nt=222.4	87	88 Ra=226.0	89 Ac=230?	90 Th=232.15	91	92 U=238.2		
*Elements not classified above			59 Pr=140.9	60 Nd=144.3 61	62 Sa=150.4 63 Eu=152.0	64 Gd=157.3 65 Tb=159.2	66 Dy=162.5	67 Ho=163.5 68 Er=167.7	69 Tm=169.9	70 ?Tm_2 71 ?Yb=173.5 72 ?Lu=175

FISHER SCIENTIFIC CO. PITTSBURGH, PA.

5-710 5-715

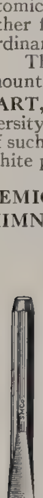
5-710. CHART, Periodic System, Silverman, Wall Size, compiled by Dr. Alexander Silverman of the University of Pittsburgh. This chart is based on Mendeleeff's Periodic System of the Elements and Moseley's Atomic Numbers. It shows the elements classified according to group, type formula, family, series and period, atomic weight and also gives Moseley's atomic number. The Moseley numbers are printed in red and the other figures in black. This makes the reading of the chart a simple matter, particularly at distances ordinarily encountered in large lecture halls.

The chart is printed on heavy coated paper, with linen back. It is 86 inches wide by 36 inches high, mounted on heavy wooden rollers, top and bottom. **Each, $6.00**

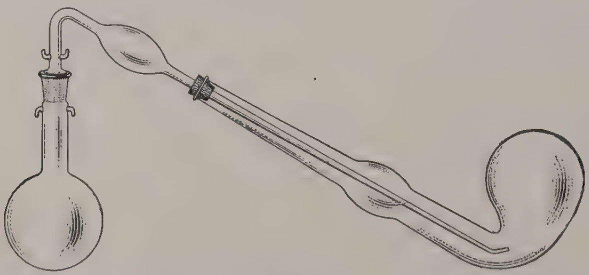
5-715. CHART, Periodic System, Silverman, Folder Size, compiled by Dr. Alexander Silverman of the University of Pittsburgh. All of the information given in Chart No. 5-710 is embodied in this folder, which is of such a size as can be pasted in the textbook for ready reference. It is printed in black and red on heavy white paper, 11 inches wide by 8½ inches high, and folded to 5½x8½ inches. **Each, $ .15**
Per dozen, $1.20

CHEMICALS. See Reagent List in the rear of this catalogue.

CHIMNEYS. See Burner Accessories, pages 120 and 121.



5-720



5-725

5-720. CHISEL, Cold. Useful for opening boxes, etc. in the laboratory. Length, 6 inches. Width of blade, one-half inch. **Each, $ .40**

5-725. CHLORINE APPARATUS, Bunsen and Fresenius; for generating and absorbing chlorine and other gases. The apparatus is made entirely of glass, with ground joint where the delivery tube fits into the flask. Glass lugs are fused to the delivery tube and to the neck of the flask, so that these two pieces can be wired together. The flask contains about 150 ml.; and the apparatus is 415 mm. long, over all. **Each, $3.50**

BUNSEN CLAMPS

5-730

5-735

5-730. CLAMPS, Bunsen, Round Jaws, Armco Iron, with concealed spring. These clamps are of a new design, are made of eighteen (18) gauge Armco Ingot Iron which is very resistant to rust, and are heavily coated with black enamel. They are eight times as strong as cast iron, although the weight is much lighter. The coil spring, which makes the jaws of the clamp self-opening, is concealed in the joint, thereby doing away with the possibility of the spring catching on the thread of the screw-bolt. The nickel-plated wing-nut and screw-bolt are easily removable and are replaceable. The jaws are rubber covered, to reduce the risk of glassware breakage.

Clamp holders must be used to attach these clamps to supports. The clamp holders (see No. 5-755 and No. 5-760) are not included in the prices here listed.

Size	A	B
Holds apparatus, inches diameter	⅜ to 1¼	¾ to 2
Length over all, inches	8	9
Diameter of clamp rod, inch	⅜	½
Each	$ .35	.50

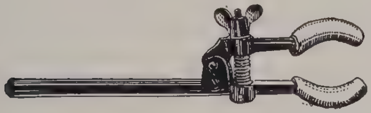
Per dozen, 10% discount.

5-735. CLAMPS, Bunsen, V-Shaped Jaw, Armco Iron, with concealed spring. The construction of these clamps is similar to No. 5-730, except that the lower jaw is V-shaped and the upper jaw is flat. These jaws fit together in such a way that makes the clamps particularly adapted to hold securely the smaller diameters for which each clamp is intended. Made of rust-resisting Armco Ingot Iron and coated with black enamel.

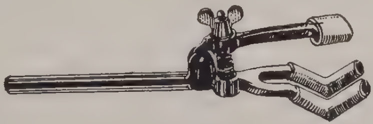
Clamp holders must be used to attach these clamps to supports. The clamp holders (see No. 5-755 and No. 5-760) are not included in the prices here listed.

Size	A	B
Holds apparatus, inches diameter	¼ to 1¼	⅜ to 2
Length over all, inches	8	9
Diameter of clamp rod, inch	⅜	½
Each	$ .35	.50

Per dozen, 10% discount.



5-740



5-745

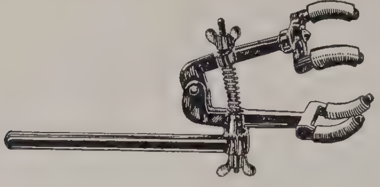
5-740. CLAMP, Bunsen, Round Jaws, Cast Iron, large size. This is a large size and will hold apparatus from ¾ inch to 2½ inches diameter. The length over all is 10 inches and the diameter of the clamp rod is ½ inch. The jaws are rubber covered, to reduce the risk of glassware breakage. A coil-spring makes the jaws self-opening and a wing-nut is used to tighten them around the apparatus.

A clamp holder must be used to attach this clamp to supports. The clamp holder (see No. 5-755 and No. 5-760) is not included in the price here listed. **Each, $ .70**

5-745. CLAMP, Bunsen, Double V-Shaped Jaw, Cast Iron, black enameled. This is an extra large clamp and will hold apparatus from ½ inch to 2½ inches diameter. The length, over all, is 10 inches and the diameter of the rod ½ inch.

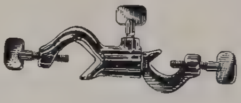
The feature of this clamp is that the under jaw is V-shaped and double-pronged, while the upper jaw is flat. These jaws fit together in such a way that apparatus, especially of the smaller diameters, is held very secure. The jaws are rubber covered to reduce the risk of glassware breakage. A coil-spring makes the jaws self-opening and a wing-nut is used to tighten them.

A clamp holder must be used to attach this clamp to supports. The clamp holder (see No. 5-755 and No. 5-760) is not included in the price here listed. **Each, $ .95**



5-750

5-755



5-760

5-750. CLAMPS, Bunsen, Universal; Cast Iron, black enameled. The prongs of the upper jaw are on a swivel which permits the gripping of **irregular shaped apparatus,** such as retorts, etc. Both jaws are rubber covered and double-pronged, designed so that the prongs of the upper jaw fit between the prongs of the lower jaw. This arrangement makes it possible for this clamp to hold **both large and small apparatus.**

Another swivel joint is placed between the clamp rod and the jaws. Corrugations on the clamp rod fit into similar ones on the jaw arm. A wing-nut is used to tighten this joint. This joint permits apparatus to be **clamped at any angle.** A coil spring makes the jaws self-opening and a wing-nut is used to tighten them around the apparatus.

Clamp holders must be used to attach these clamps to supports. The clamp holders (see No. 5-755 and No. 5-760) are not included in the prices here listed.

Size	A	B
Holds apparatus, inches diameter	¼ to 2	½ to 3
Length over all, inches	8	10
Diameter of clamp rod, inch	⅜	½
Each	$ .75	1.00

Per dozen, 10% discount.

5-755. CLAMP HOLDERS, Simple Form; made of black enameled iron. This style of clamp holder is the most popular one for fastening clamps Nos. 5-730, 5-735, 5-740, 5-745 and 5-750 to support rods. These clamp holders can also be used with ring burners, extension rings, etc. Both openings are the same size.

Size	A	B
For rods up to, inch diameter	½	¾
Each	$ .28	.30

Per dozen, 10% discount.

5-760. CLAMP HOLDER, Adjustable; made of black enameled iron. One side of this holder is movable and can be turned completely around. It can be locked in any position by a thumb-screw. The clamp holder can be used on any rod up to ¾ inch diameter in connection with Clamps Nos. 5-730, 5-735, 5-740, 5-745 and 5-750. Both openings are the same size.

Each, $ .65
Per dozen, 10% discount.

5-765

5-770

5-775

5-765. CLAMP, Burette, Adjustable, Self-opening; made with a lock-nut for locking at any desired angle. The clamp is black enameled and the jaws are rubber covered to reduce the risk of breakage of glassware apparatus and to prevent smooth articles from slipping. A coil spring makes the jaws self-opening and a wing-nut is used to tighten them. The clamp is 7 inches long, over all, with an extension of another ½ inch at the lock-nut.

This clamp can be attached to support rods up to ½ inch diameter and will hold burettes and other apparatus from ¼ to 1¾ inches diameter. It is one of the most generally used clamps in the laboratory.

Each, $ .40
Per dozen, 10% discount.

5-770. CLAMP, Burette, Self-closing. The clamp is black enameled and the jaws are rubber covered. A coil spring is placed so that the jaws are self-closing. The clamp is opened by pressure of the thumb and, when released, automatically grips the object to be held.

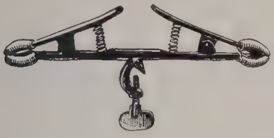
This clamp can be attached to support rods up to ½ inch diameter and will hold burettes and other apparatus from ¼ to ¾ inch diameter.

Each, $ .50
Per dozen, 10% discount.

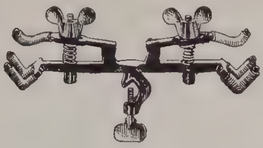
5-775. CLAMP, Automatic Burette; made of steel, black enameled, with rubber covered jaws, which are self-opening. A coil spring and a wing-nut are used to adjust the object to be held. A lock-nut fastens the clamp at any angle within a circle. Two wing-nuts tighten the clamp to the support.

This clamp was originally designed for supporting automatic burettes with bottle reservoirs, by attaching the clamp to the neck of the bottle. It can also be used generally for supporting apparatus from ¼ inch to 1¾ inches diameter, when the support is between 1 inch and 1½ inches diameter.

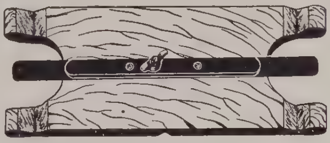
Each, $1.25
Per dozen, 10% discount.



5-780



5-785



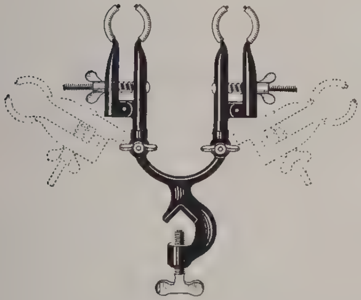
5-790

5-780. CLAMP, Double, Burette, Self-closing. The two coil springs are so placed that each pair of jaws is opened independently by pressure of the thumb and, when released, automatically grip the object to be held. The clamp is black enameled, with rubber covered jaws; is 7 inches long, over all; can be attached to support rods up to ½ inch diameter; and will hold burettes or other apparatus, two at a time, whose diameters are between ¼ and ¾ inch. **Each, $ .75**
Per dozen, 10% discount.

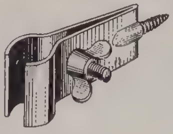
5-785. CLAMP, Hoffman, Double, Burette, Self-opening. The under prongs are double V-shaped to insure a secure grip in connection with the single upper prong. The coil springs make the jaws self-opening and wing-nuts are used to tighten them around the apparatus. The clamp is black enameled, with rubber covered jaws; is 7 inches long, over all; can be attached to support rods up to ½ inch diameter; and will hold burettes, or other apparatus, two at a time, whose diameters are between ⅛ and 1 inch. **Each, $1.30**
Per dozen, 10% discount.

5-790. CLAMP, Lincoln, Double, Burette. The burettes, or other apparatus, are placed in position by lifting the double, flat, metal spring with the thumb and slipping the burettes into the notches of the wooden block. When the spring is released, it automatically holds the burettes. The flat spring is not affected by the wing-nut which tightens a metal loop around the support rod in the rear.

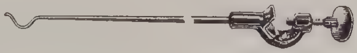
The wooden block is 9 inches wide and 3½ inches high. It is notched in the rear to fit over the support rod. The two notches in front will take burettes, or other apparatus from ⅜ to ⅝ inch diameter. **Each, $ .90**
Per dozen, 10% discount.



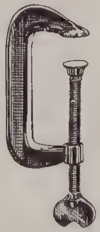
5-795



5-800



5-805



5-810

5-795. CLAMP, Lunge, Double Adjustable Arms; for supporting two parallel tubes, such as lecture apparatus, showing electrolytic decomposition of liquids, etc. (See Electrolytic Decomposition Apparatus.) The clamp can also be used as a double burette clamp or to support two pieces of apparatus in the same plane, at various angles to each other, within the radius of almost a semicircle.

The jaws are rubber covered, to reduce the risk of glassware breakage. Individual coil springs make each jaw self-opening and wing-nuts tighten each jaw separately. Both arms of the clamp are movable and are fastened independently by separate wing-nuts. They can be adjusted to hold tubes from ¾ inch to 7 inches apart. The jaws will take apparatus from ¼ inch to 1¾ inches diameter. The screw clamp will fit support rods up to ½ inch diameter. The clamp is black enameled to withstand corrosion and measures about 7 inches from wing-nut to tip of jaw (in the position shown in the illustration). **Each, $2.00**
Per dozen, 10% discount.

5-800. CLAMP, Wall Type, with wood screw; for attaching burettes, fermentation tubes and other small apparatus to walls, boards, etc. When used for burettes, the jaws can be spread so that the graduation marks on the burette will not be covered. The clamp is nickel-plated and adjusted by a wing-nut. It is 2½ inches long, over all, and will hold apparatus from ⅜ to ¾ inch diameter. If the jaws are covered with rubber tubing, diameters down to ⅛ inch can be held securely. Furnished without rubber tubing. **Each, $ .40**
Per dozen, 10% discount.

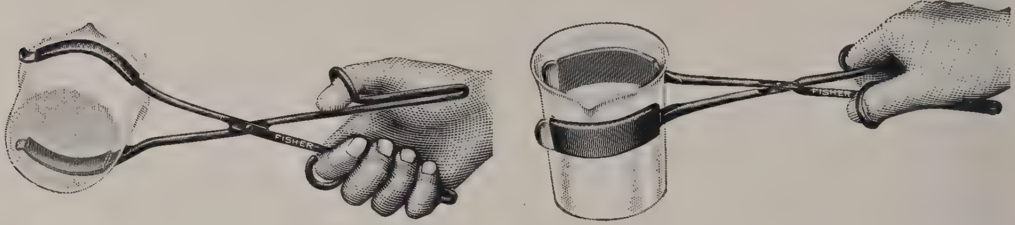
5-805. CLAMP, Hook; for supporting thermometers and other light apparatus. When attached to a vertical rod, the hook supports thermometers, etc., in a vertical position. The clamp is black enameled; it can be attached to support rods up to ½ inch diameter. The hook is 3¾ inches long and the whole clamp about 7 inches, over all. **Each, $ .90**
Per dozen, 10% discount.

5-810. CLAMP, Screw; made of black enameled iron. The cap, at the end of the screw, is fitted with a ball and socket joint which prevents it from turning and makes it adjustable for irregularities. Used for clamping apparatus to table tops or for holding two pieces of apparatus together.

Size of opening, inches	3	4	6
Each	**$ .70**	**.95**	**1.50**

Per dozen, 10% discount.

FISHER SAFETY BEAKER TONG



FIRMLY GRIPPED - SAFELY TIPPED

2-620

2-620. CLAMP, BEAKER, Fisher Safety Tong. (*Patent applied for.*) **Made of Ascoloy.** Designed to fulfill the requirements of a device for the convenient and safe handling of beakers containing hot solutions, and for pouring their contents.

The handles extend beyond the finger-holds so that the weight of the beaker is supported by the palm of the hand and not merely by the fingers. The finger-hold and thumb-hold are designed so that the hand is held in its natural position with the end of the thumb against the outside of the handle. (*See illustration showing the gripping.*)

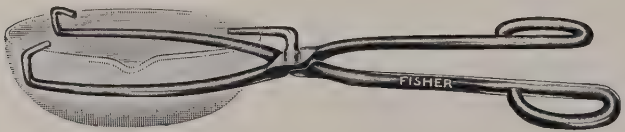
The jaws of the tong are one (1) inch wide, and are rubber covered. These grip the beaker firmly and permit it to be tipped without changing its position in the tong. The rubber covers on the jaws are replaceable.

Ascoloy. The entire tong is made of Ascoloy, a new stainless iron, which is tough and resists bending; will not rust, and is highly resistant to acids, especially nitric acid.

The Fisher Safety Beaker Tong will firmly grip Griffin Form Beakers from 100 ml. to 1500 ml. capacity. The tong is 13 inches long over all.

We recommend this tong as the most convenient for handling beakers, also as a good and inexpensive form of accident prevention. **Each, $1.25**

FISHER SAFETY DISH TONG



5-815

5-815. CLAMP, DISH, Fisher Safety Tong. (*Patented December 1924.*) **Made of Ascoloy.** This is a new tong designed especially to fill the need of a device for the convenient and safe handling of hot evaporating dishes and their contents.

Design: With this tong, dishes are firmly gripped by the tong and held in this grip by the hand, and not merely supported and held by a piece of spring wire.

The tips of the jaws project up and over the top of the dish, and a center prong from the joint projects out over the top of the dish. The dish is held below and on the sides by the jaws, and at three points on the top by the prongs so that it cannot possibly get out of tong until the handles are released.

Features: The grip permits hot dishes to be handled without liability of spilling the contents, or dropping the dish.

Contents of dishes can be poured without liability of spilling.

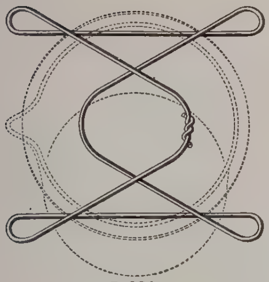
Dishes can be held firmly in an inverted position, and precipitates brushed out.

Ascoloy. The tong is made of Ascoloy, a new stainless iron, which is tough and resists bending; will not rust, and is highly resistant to acids, especially nitric acid.

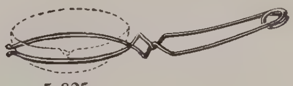
The Tong is 9½ inches over all. This one size tong adjusts itself to different size dishes; and will firmly grip any size evaporating dishes, sizes B to E inclusive, or similar vessels with diameters from 75 mm. to 125 mm. inclusive.

The Fisher Safety Dish Tong is the only device that we know of with which hot dishes and their contents can be handled conveniently and without liability of accidents. **Each, $1.25**

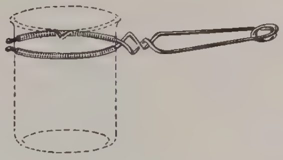
WIRE CLAMPS



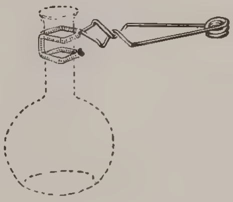
5-820



5-825



5-825



5-830

5-820. CLAMP, Brooks, Beaker Cover; for holding watch glasses on beakers. This clamp can also be used as a funnel support, when filtering directly into a beaker.

The wire, from which the clamp is made, is of spring brass, making the clamp easy to take on or off. The clamp will hold watch glasses on Griffin beakers from 250 to 600 ml. capacity. **Each, $ .12**

Per dozen, 10% discount

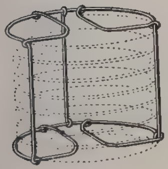
5-825. CLAMPS, Chaddock, for Beakers and Evaporating Dishes; made of spring wire, black enameled, with rubber covered jaws. Intended for lifting beakers and dishes from hot plates, etc. They are self-closing, and therefore grip by the spring only, which is just enough to support the weight by the flared rim. When used for evaporating dishes, the jaws should be bent spoon shape in the laboratory and the rubber tubing removed. In lifting a dish, the jaws do not grip; it must be held open at the proper diameter, while the dish is being supported. These clamps are adapted to lifting only and must be used with care; for gripping and pouring, see Clamps Nos. 2-620 and 5-815, listed on page 190.

Size	A	B
Length over all, inches	8	11
For Griffin Beakers, ml	100 to 400	250 to 600
For Evaporating Dishes, ml	60 to 90	80 to 100
Each	$ .25	.30

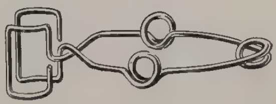
Per dozen, 10% discount.

5-830. CLAMP, Chaddock, for Flasks and Test Tubes; made of heavy spring wire, black enameled, with double bent, rubber covered jaws. This clamp can be used to lift flasks by the necks, or for holding test tubes from ½ inch to 1½ inches diameter. **Each, $ .35**

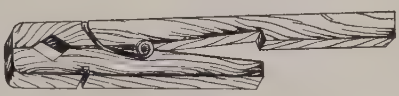
Per dozen, 10% discount



5-835



5-840



5-845

5-835. CLAMP, Petri Dish; made of nickel-plated, brass, spring wire. This clamp will hold together seven (7) Petri Dishes 100x10 mm. or five (5) Petri Dishes 100x15 mm. Used for the convenient handling of Petri Dishes and for holding them in place when in the sterilizer. **Each, $ .60**

Per dozen, 10% discount

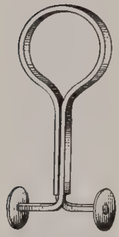
5-840. CLAMP, Stoddard, Test Tube; made of nickel-plated, spring wire, with two loops for finger grips. The clamp is 4½ inches long, over all, and can be used for test tubes up to 1½ inches diameter. **Each, $ .14**

Per dozen, 10% discount; **per gross,** 20% discount

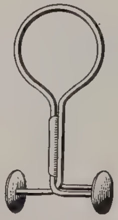
5-845. CLAMP, Test Tube, of wood. A strong spring makes the clamp self-closing and easily handled. The clamp is about 7¼ inches long, over all, and will hold test tubes from ½ to ¾ inch diameter. **Each, $ .15**

Per dozen, 10% discount; **per gross,** 20% discount

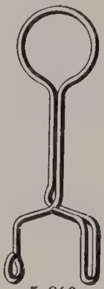
CLAMPS FOR RUBBER TUBING



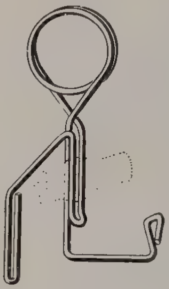
5-850



5-855



5-860



5-865

5-850. CLAMPS, Bronze Pinchcock, Flat Jaws; for rubber tubing. This pinchcock clamp is manufactured from one piece of heavy, nickel-plated bronze which makes the clamp retain its shape and spring. The jaws are flat, with rounded edges, so that they cannot cut the rubber tubing, even though the spring is very strong. The finger grips are riveted on, no solder being used, which makes the clamp almost unbreakable.

Size	A	B
Length over all, inches	2¾	3½
For outside diameters up to, inches	⅜	⅝
Each	$ .18	.24

Per dozen, 10% discount; **Per Gross,** 20% discount.

5-855. CLAMPS, Mohr, Pinchcock; for rubber tubing. This clamp is made of nickel-plated spring wire, with button finger grips. One jaw of the clamp is made flat by attaching an extra piece of metal.

Size	A	B	C
Length over all, inches	2½	3	3½
For outside diameters up to, inches	⅜	½	⅝
Each	$ .16	.18	.20

Per dozen, 10% discount. **Per gross,** 20% discount.

5-860. CLAMP, Mohr, Pinchcock, One-piece, for rubber tubing; made of one piece of nickel-plated, spring wire. The clamp is 3 inches long, over all, and can be used with rubber tubing up to ½ inch diameter.

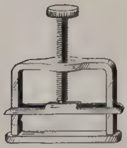
Each, $ .12

Per dozen, 10% discount. **Per gross,** 20% discount

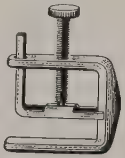
5-865. CLAMP, Chaddock, Pinchcock, open end, for rubber tubing; designed so that it can be put on or taken off rubber tubing, without disconnecting the apparatus. The clamp is made of nickel-plated spring wire; is 3¼ inches long, over all; can be used with rubber tubing up to ⅜ inch outside diameter.

Each, $ .18

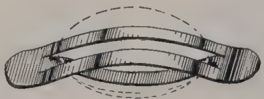
Per dozen, 10% discount



5-870



5-875



5-880

5-870. CLAMPS, Hoffman, Screw Compressor Type, for rubber tubing. The clamps are nickel-plated and are made with rounded edges to prevent cutting the tubing.

Size	A	B
Size of opening, inches	½ x ¾	¾ x 1
Each	$ .25	.30

Per dozen, 10% discount.

5-875. CLAMPS, Hoffman, Open Side. This clamp is the screw compressor type and made with one side open, so that rubber tubing can be inserted without disconnecting the apparatus. The jaws have rounded edges to prevent cutting the tubing.

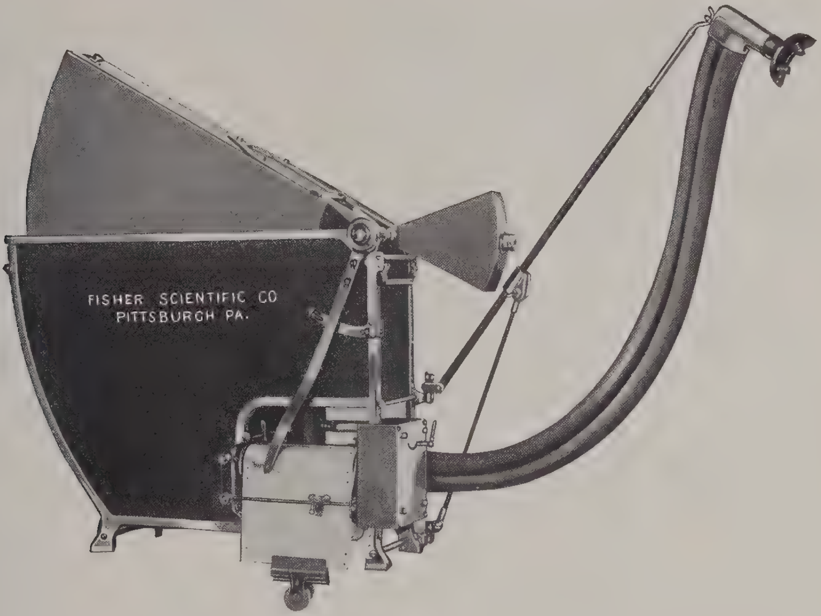
Size	A	B
Size of opening, inches	½ x ¾	¾ x 1
Each	$ .25	.30

Per dozen, 10% discount.

5-880. CLAMP, Watch Glass, for clamping together paired watch glasses up to and including 2½ inches diameter. The clamp is nickel-plated; is 4¼ inches long, over all, with a double slit 3½ inches long; and is ⅞ inch wide.

Each, $ .30

CLINICAL DIAGNOSTIC APPARATUS



5-900

5-900. METABOLISM APPARATUS, McKesson Recording, with new tables for clinical study and for computation of basal metabolism. This instrument has been designed especially to measure the metabolic rate, and is also employed to graphically represent and record the volume and character of respiration, and the vital capacity in diseases other than those in which basal metabolism is an important factor such as cardiopathies, nephropathies, carbon monoxide poisoning, and other toxemias.

By means of the rulings on the chart one is able to read directly the volume of respirations, rate per minute, and vital capacity in addition to the rate of oxygen absorption. This apparatus is an excellent instrument for the administration of oxygen in pneumonia or other similar diseases and provides a definite record of the administrations and their effects, during the absence of the physician.

It measures the rate of oxygen absorption by absorbing the generated carbon dioxide in soda lime. From the quantity of oxygen absorbed by the patient in a given period of time, the rate of metabolism is readily calculated. As with other clinical instruments of this type, the respiratory quotient is not ordinarily determined. The calculations are therefore based upon the generally accepted quotient of .82. As this sometimes introduces an error of one to two per cent, and the patient usually presents similar variations, and as a reading of 10 per cent above or below the absolute normal basal metabolism is regarded within normal limits, this method is well within the limits of error and therefore entirely dependable for clinical use.

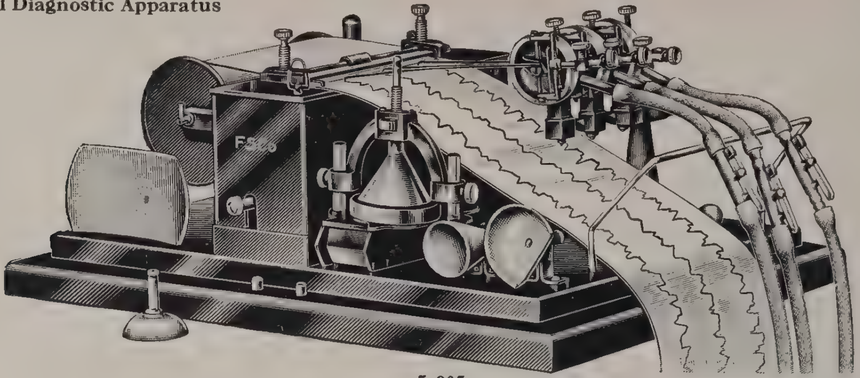
The Apparatus consists essentially of a large counterbalanced, water-sealed calibrated gasometer, directly connected to the breathing tubes and mouth-piece for the patient. The tubes and mouth-piece are supported by an adjustable arm which carries all the weight, relieving all tension on the patient's mouth and contributing greatly to his comfort. All valves are of flexible rubber and act very easily, relieving the patient of the necessity of forcing the expired air through heavy valves as has often been necessary with the older types of apparatus.

The Gasometer for the oxygen, air or oxygen-air mixture, is directly connected to a long arm carrying a pen and ink, which moves across a chart propelled by a clock. Proportions of the stylus arm and speed of chart and chart rulings, are such that the readings may be taken directly in liters of oxygen absorbed per minute.

From these readings the metabolic rate can be easily calculated. The older methods of calculation involved long and tedious operations. By means of the three tables supplied with this apparatus, this has been largely eliminated, and amounts to but a simple reference to the tables for the constants corresponding to the readings on the chart and finding the rate directly. Three tables are supplied: Table **A** corrects for temperature, pressure, aqueous vapor saturation and calorific equivalent of oxygen consumed. Table **B**, Du Bois Surface Area Chart, based on the weight of the patient and height in inches, gives the surface area directly in square meters. Table **C**, or percentage chart, based upon Aub and Du Bois Normal Standards, gives the percentage above or below the Normal Basal Metabolic Rate.

This Apparatus, therefore, gives complete and permanent record of the actual rate of oxygen consumption, is automatic in operation and with the aid of the charts gives the operator a detailed history of the patient's condition at a glance.

McKesson Recording Metabolator is supplied complete with inhaler, nose clip, chart, soda lime, three calculating charts and a set of instructions for operation. **Each, $250.00**



5-905

5-905. POLYGRAPH, Ink, Mackenzie, American Model. For graphically recording the beat of the heart, and the study of the irregularities of the heart muscles, particularly the auriculo-ventricular bundle.

This instrument simultaneously and graphically records with pen and ink on a moving chart, the pulsations occurring at three different points of the blood system. The impulse of the blood stream compresses the air in a tambour. This air then acts on a diaphragm attached to a needle moving over a roll of glazed paper.

The speed of the paper is controlled by clockwork which may be regulated so as to cover the entire roll of paper (100 feet long by 4½ inches wide) in any period of time from ½ to 1 hour in length. Reactions in periods of 0.2 second duration can be easily read. The driving mechanisms for paper feed and time marker consist of spring actuated movements, operating independently of each other.

All pens are balanced at the diaphragms by torsion springs, reducing friction to a minimum, and at the same time permitting long leverage for greater amplitude of oscillation. This mounting insures accurate records of every detail of the pulse cycle.

Throughout the instrument, every care has been exercised to insure accurate records of actual conditions. All adjustments are by micrometer screws. All timing devices are easily and accurately controlled; friction has been reduced to a minimum and to insure accurate alignment, the entire apparatus is rigidly mounted on a base

Mackenzie Ink Polygraph, American Model, with receiving cups for jugular and apex, carotid and liver, three tambours, recording pens, bottle of ink and two rolls of glazed paper, complete in polished mahogany carrying case with lock and key. **Each, $200.00**

5-910. WRIST SPHYGMOGRAPH, Model A, button style; for use with No. 5-905 Mackenzie Polygraph. **Each, $35.00**

5-915. WRIST SPHYGMOGRAPH, Model B, with cushioned tambour, complete with breast plate; for use with No. 5-905 Mackenzie Polygraph. **Each, $45.00**

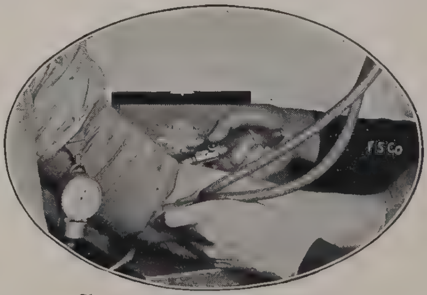
5-920. POLYGRAPH PAPER, Glazed, for No. 5-905 Mackenzie Polygraph; in rolls 4½ inches wide and 100 feet long. **Per Roll, $ .70**

5-925. POLYGRAPH INK, Red, for No. 5-905 Mackenzie Polygraph; in glass dropping bottle. **Per bottle, $ .50**

5-930. POLYGRAPH INK, Blue, for No. 5-905 Mackenzie Polygraph; in glass dropping bottle. **Per bottle, $ .50**

5-935. POLYGRAPH INK, Black, for No. 5-905 Mackenzie Polygraph; in glass dropping bottle. **Per bottle, $ .50**

5-940

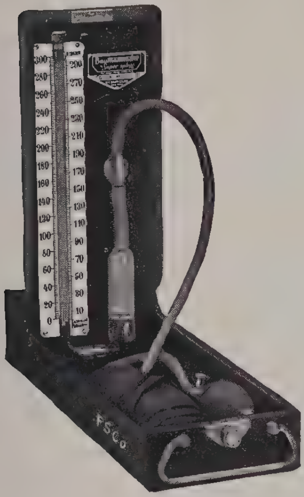


Showing method of auscultation with No. 5-940 Sphygmomanometer

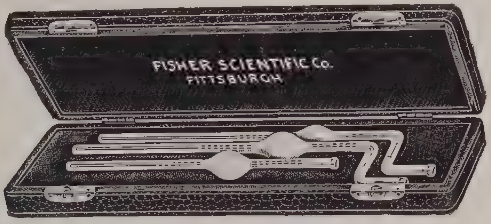
5-940. SPHYGMOMANOMETER, Rogers-Tycos, Self-Verifying, Pocket Size, for the determination of blood pressure (systolic, diastolic, and pulse).

This instrument bears practically the same relation to mercury column instrument as does the aneroid to the mercurial barometer. Every care has been taken in design of diaphragms as to tensile strength, resistance to oxidation, and discoloration, so that this instrument will give reliable service and accurate readings. By means of a special constructional device the zero point is set once and for all time, and can be checked by noting its position relative to a fixed mask on the dial.

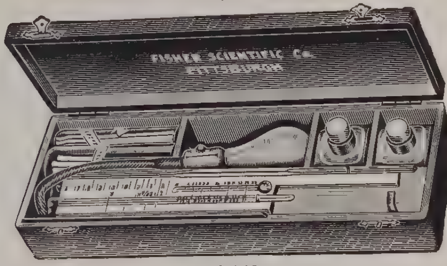
Supplied complete with arm sleeve, connecting tubing, inflating bulb and control valve, in morocco leather carrying case, 6x3x1 inches. **Each, $25.00**



5-942



5-944
See also No. 5-945, No. 5-946 and 5-947



5-949

5-942. **SPHYGMOMANOMETER (Baumanometer),** for determining blood pressure (systolic and diastolic). This instrument is of the mercury manometer type with hand calibrated scale 300 mm. long and fitted with a special stabilizing chamber for eliminating oscillation of the mercury column. In this Sphygmomanometer there are no sliding scales to adjust, no air pockets to shake out of the mercury column, no valves to leak, and no moving parts to readjust. The mercury tube is made of one continuous piece of glass to insure uniformity of bore of column.

The apparatus is supplied complete with arm-band, pressure bulb, and connecting tubing, mounted in a polished-wood carrying case, size 14½x4¾x2½ inches. **Each, $32.00**

5-944. **STALAGMOMETER, Traube,** for determining the surface tension of blood, serums, etc., by the drop method. The method consists in determining the number of drops falling from the end of the stalagmometer while the surface of the liquid within the bulb is lowered from the upper to the lower mark. (For details of method, see Findlay "*Practical Physical Chemistry,*" *79* (*1923*), and *Bircumshaw* "*Journal Chemical Society, 121, 887* (*1922*).

The apparatus consists of three calibrated capillary tubes, the ends of which are flattened out to give a larger dropping surface, and are ground flat and polished. Bulbs are blown in the tubes near the centers, and the ends are etched with 20 divisions so as to facilitate reading the volumes of the drops by noting how many scale divisions correspond to one drop. There are three tubes; one for blood and viscous liquids in general, one for small quantities of less viscous liquids, and one for larger quantities of less viscous liquids. Supplied complete as described, in a velvet lined case. **Each, $35.00**

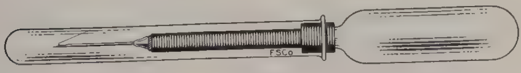
5-945. **STALAGMOMETER TUBE, Traube, for blood;** supplied without case.................. **Each, $13.50**

5-946. **STALAGMOMETER TUBE, Traube, for small quantities of thin, non-viscous liquids;** supplied without case. **Each, $13.50**

5-947. **STALAGMOMETER TUBE, Traube, for large quantities of thin, non-viscous liquids;** supplied without case. **Each, $13.50**

5-949. **VISCOSIMETER, Hess,** for the determination of the viscosity of blood, serums, colloidal solutions, etc. (For method, see *Morris* "*Clinical Laboratory Methods,*" *256* (*1916*).

Apparatus consists of standardized, calibrated capillary tubes, through which the blood, or other liquid to be tested, and water are forced by suction supplied by pressing a rubber bulb. Supplied complete with two extra capillary tubes, two bottles for water and ammonia and a rubber bulb. **Each, $23.00**



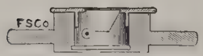
5-950

5-955

5-950. **BLOOD COLLECTING TUBE, Keidel-Vacuum,** for obtaining blood specimens to be used in the Wassermann Test. The ampoule contains 5 to 6 ml. and is connected to a No. 22 Hyperdermic Needle by means of rubber tubing. After inserting the needle, the glass tip of the evacuated ampoule is broken and the blood is drawn into the ampoule to about 90 per cent of its capacity. The sample can then be transported, after replacement of the glass protecting tube, without further sealing. **Each, $ .25**
Per dozen, $2.40

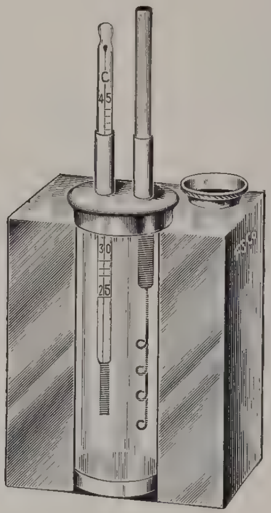
5-955. **BLOOD LANCET, Moore,** for making small incisions for blood counts, coagulation tests, etc. Needle has an automatic needle release and an adjustment for regulating the depth of the cut. The instrument is nickel-plated and can be sterilized. **Each, $2.50**

COAGULOMETERS



Showing cross-section of No. 5-960 Coagulometer

5-960



5-965

5-960. COAGULOMETER, Brodie-Russell-Boggs, for determining the coagulation time of the blood on the stage of a microscope. The instrument consists of a heavy, highly polished, metal ring inclosing a chamber approximately 16 mm. diameter and 13 mm. deep with a glass bottom. A small amount of water is poured into this inclosure and it becomes a moist air chamber in which the blood drop hangs during examination. In the cover, which fits snugly, is fitted an inverted truncated glass cone, the under surface of which is about 4 mm. diameter. Upon this flat surface, the drop of blood is collected. In the side of the chamber, a fine tube is inserted. This is connected to a rubber bulb and adjusted so that a stream of air can be directed, at a tangent, against the periphery of the drop of blood. To equalize the air pressure inside the chamber, a small hole is drilled through the cover. The two bars on the outside are for convenience in handling the instrument.

After the blood drop has been procured and properly placed in the moist air chamber, very gentle blowing, at 30 second intervals, is begun by means of the rubber bulb. Coagulation time is calculated from the exit of the blood from the blood vessel until, under the microscope with a low power objective, the red corpuscles are seen to obtain an elastic radial motion. The first appearance of this, with an indentation in the edge of the blood drop, is the end point of the determination.

Among the advantages claimed for this coagulometer are that all of the successive observations, until the point of coagulation, are made on the same drop of blood where no inaccuracy occurs due to the collection of several drops of blood one or more seconds apart and also that the blood is examined for coagulation directly and not through the medium of some other liquid like water.

Supplied in a neat, velvet lined case, with directions for use. **Each, $15.00**

5-965. COAGULOMETER, Biffi-Brooks, for determining the coagulation time of the blood; consists of a nickel-plated, metal water jacket, 90 mm. high, 70 mm. wide and 45 mm. deep; a cylindrical glass coagulating chamber; a thermometer graduated from 25 to 45° C. and a set of platinum loops inserted in an aluminum handle.

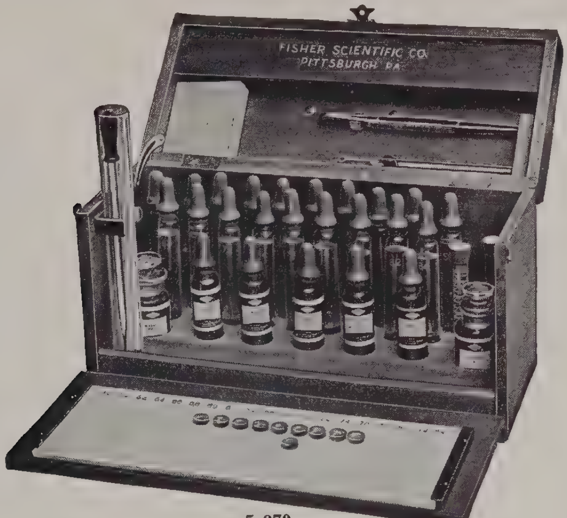
The technique is simple and accurate and results may be procured by anyone who is familiar with the object to be attained.

The water jacket is filled full and the coagulating chamber half full of water heated slightly higher than body temperature. From a suitable incision, the platinum loops are rapidly passed through the blood so that each loop is filled simultaneously with a drop of blood exactly the same size. The aluminum handle is then quickly placed in the proper receptacle in the metal cover of the coagulating chamber and the loops are suspended in the moist air just above the water. After waiting a short time, considerably less than the normal coagulation time for that specie, the first loop, with its blood drop, is pushed down into the water. If coagulation has not begun, the blood will be dispelled immediately throughout the water; but, if fibrin has started to form, more or less blood will adhere to the loop.

When coagulation is complete, the whole mass of blood will remain intact in the platinum loop for a considerable time after the immersion into the water. If the blood in the first loop has not coagulated, the drops in the other loops are immersed at half minute intervals and the coagulation time is computed from the time of the appearance of the blood until the time when fibrin formation is first evident in the loop.

The approximate time having been established, a second reading, if desirable, at intervals of 10 or 20 seconds, will determine the exact coagulation time of any blood.

Compactly arranged in a pasteboard box, with directions for use. **Each, $14.50**



5-970

5-970. CLINICAL HYDROGEN-ION TESTING SET, Brown-La Motte. An improved, complete portable outfit for the colorimetric study of Hydrogen-Ion Concentration according to the method of Dr. J. Howard Brown, Johns Hopkins Medical School, Baltimore, Md. (*Journal of Laboratory and Clinical Medicine IX, 4, Jan., 1924*). This set is primarily designed for use where only small amounts of material are available for test, such as Serums, Culture Mediums, Urine, Water, Spinal Fluids, Muscle Juices, Milk, Tissue Extracts, Digestive Fluids and Animal Secretions. However, its general utility and wide range make it adaptable to many other determinations.

The set consists of the following materials all mounted in a convenient carrying case:

Nineteen vials, buffer solutions (15 ml. each), with individual pipettes and nipples, containing standardized, sterile buffer solutions reading from pH 4.8 to 8.4, in intervals of 0.2 pH. This range can, however, be changed or extended within the limits 1.2 to 10.0, to meet the needs of all workers. These vials are made of special non-soluble glass and the pH value of each solution is etched on the vial so that the difficulty usually encountered with labels is eliminated. The vials are so placed that each one is clearly visible.

Four vials, indicator solutions (20 ml. each), with individual pipettes and nipples, containing the indicator solutions. The vials are made of special non-soluble glass. The indicators usually supplied are, .04 per cent solution of Bromcresol Green, pH 4.0 to 5.6; .04 per cent solution of Bromcresol Purple, pH 5.2 to 6.8; .04 per cent solution of Bromthymol Blue, pH 6.0 to 7.6; and .02 per cent solution of Phenol Red, pH 6.8 to 8.4. Indicators covering different ranges or additional indicators will be furnished on request. All indicators are in alcoholic solution, unless otherwise specified, because the diffusion currents caused by the addition of the alcoholic solutions of the indicator will bring about an instant and thorough mixing of the contents of the cells.

Two dozen glass cells, 10 mm. inside diameter and 3 mm. inside depth, to be used as cups to contain the standards and the substances to be tested. These cells are made of non-soluble glass, and are selected for their uniformity of size. The bottoms of the cells are sealed on (not cemented) and the junction with the wall is rounded so that the cells may be readily cleaned.

Opal glass plate, in rack fastened to front (inside) of case, on which are etched the series of pH values corresponding to the numbers on the buffer vials. The plate is 11½ inches long and 4 inches wide, and may be removed from the rack for cleaning.

One vial (20 ml.), with individual pipette and nipple, to hold distilled water (made of non-soluble glass).

Two glass stoppered bottles to hold the used or soiled cells. One contains water for cells in which sterile solutions or liquids have been used, while the other contains an antiseptic solution (Phenol, 5 per cent).

Large platinum loop sealed in glass rod, 6 inches long, with which the sample to be tested is added to the glass cell.

Forceps for handling the glass cells, length 7 inches.

Six sampling pipettes, 7 inches long, with rubber nipples, in special compartment which is made an integral part of the top of the case. **A large glass test tube** with stopper to receive the used or soiled pipettes.

Package of blotting paper (100 sheets) for use in removing drops of water or solution from the cells or the opal plate.

With this apparatus, a single test can be made in 1 to 2 minutes. The buffer solutions and indicator solutions, as well as the other equipment included in the set, are kept in stock for prompt replacement. The apparatus and reagents included in each set are carefully standardized and enable the investigator to study the hydrogen-ion concentration of fluids over a very wide range. Indicator and buffer solutions covering the range from pH 4.8 to 8.4 are provided, since this range covers the more common fields. In case an investigator should require other ranges the proper buffer and indicator solutions will be supplied upon request. No. 5-970 Hydrogen-Ion Testing Set, complete as described. **Per set, $36.00**

HYDROGEN-ION APPARATUS, Electrolytic, see Electro-Chemical Apparatus Nos. 9-320 to 9-425.

5-975

5-980

5-985

5-975. STANDARDIZED INDICATOR DYES, Crystalline Form. With the increased use of colored solutions as indicators for determining the Hydrogen-Ion Concentration in Diagnosis, has come a demand for Standardized Dyes from which to make the Indicators. The dyes listed below have been specially synthesized according to the specifications of Clark and Lubs, and are recommended for their uniformity of composition and solubility. They are put up in sealed glass stoppered bottles, and cover the entire range of Hydrogen-Ion Concentrations of 1.2 to 10.0.

No.	Dye, Crystals	pH Value	Color Change	Price 1 gm.	Price 5 gm.
1.	**Thymol Blue, Acid**	**Acid 1.2— 2.8**	**Red-Yellow**	**$2.40**	**$10.50**
2.	**Thymol Blue, Alkaline**	**Alk. 8.0— 9.6**	**Yellow-Blue**	**2.40**	**10.50**
3.	**Bromphenol Blue**	**Acid 3.0— 4.6**	**Yellow-Blue**	**2.40**	**10.50**
4.	**Methyl Red**	**Acid 4.4— 6.0**	**Red-Yellow**	**.90**	**3.00**
5.	***Bromcresol Green**	**Acid 4.0— 5.6**	**Yellow-Green**	**3.00**	**14.00**
6.	**Bromcresol Purple**	**Acid 5.2— 6.8**	**Yellow-Purple**	**2.40**	**10.50**
7.	**Bromthymol Blue**	**Neut. 6.0— 7.6**	**Yellow-Blue**	**2.40**	**10.50**
8.	**Phenol Red**	**Alk. 6.8— 8.4**	**Yellow-Red**	**2.40**	**10.50**
9.	**Cresol Red**	**Alk. 7.2— 8.8**	**Yellow-Red**	**2.40**	**10.50**
10.	**Phenol Phthalein**	**Alk. 8.3—10.0**	**Colorless-Red**	**.40**	**.75**
11.	**Cresol Phthalein**	**Alk. 8.2— 9.8**	**Colorless-Red**	**1.25**	**5.40**

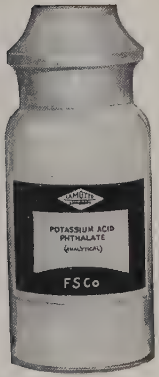
**Recently discovered by Dr. Cohen of the Hygienic Laboratory, U. S. Public Health Service, Washington. D. C. An excellent substitute for Methyl Red, since it covers practically the same pH range and does not fade in solution.*

5-980. STANDARDIZED INDICATOR DYES, Solutions, in sealed ampoules. It is frequently necessary to have sterile indicator solutions available at a moment's notice. To meet this demand, these Standardized Indicator Dyes have been put on the market in sterilized ampoules. The neck of the Type A Ampoule may be filed off and resealed immediately after the solution has been withdrawn. Type B Ampoule is a Special Tubulated Ampoule and is provided with a rubber nipple for use in the Felton Drop Method of determining the Hydrogen-Ion Concentration of small amounts of fluids. For Methods, see *Journal Biological Chemistry, Vol. XLVI, 2 (April, 1921).*

No.	Dye, Solution	Concentration	Price per 10 ml. Ampoule Type A	Price per 10 ml. Ampoule Type B
1.	**Thymol Blue**	**0.04%**	**$ .70**	**$ .90**
2.	**Bromphenol Blue**	**0.04%**	**.70**	**.90**
3.	**Methyl Red**	**0.02%**	**.60**	**.80**
4.	**Bromcresol Green**	**0.04%**	**.80**	**.95**
5.	**Bromcresol Purple**	**0.04%**	**.70**	**.90**
6.	**Bromthymol Blue**	**0.04%**	**.70**	**.90**
7.	**Phenol Red**	**0.02%**	**.70**	**.90**
8.	**Cresol Red**	**0.02%**	**.70**	**.90**
9.	**Phenol Phthalein**	**0.02%**	**.50**	**.65**
10.	**Cresol Phthalein**	**0.02%**	**.55**	**.70**

5-985. STANDARDIZED INDICATOR DYES, Solution. These Solutions of Standardized Dyes are put up for refills in the regular outfits and for use where the operator does not care to make up his own solutions. The more dilute solutions "A" are the standards usually used. The concentrated solutions "B" are more convenient to stock; they may be diluted with neutral distilled water to the concentration "A." All solutions are made up according to specifications of Clark and Lubs, and are supplied in sealed, glass stoppered bottles.

No.	Dye, Solution	Concentration A	Price 100 ml.	Price 500 ml.	Concentration B	Price 100 ml.
1.	**Thymol Blue**	**0.04%**	**$1.20**	**$3.95**	**1%**	**$3.00**
2.	**Bromphenol Blue**	**0.04%**	**1.20**	**3.95**	**1%**	**3.00**
3.	**Methyl Red (alc.)**	**0.02%**	**1.20**	**3.00**	**1%**	**1.80**
4.	**Bromcresol Green**	**0.04%**	**1.50**	**4.20**	**1%**	**3.60**
5.	**Bromcresol Purple**	**0.04%**	**1.20**	**3.95**	**1%**	**3.00**
6.	**Bromthymol Blue**	**0.04%**	**1.20**	**3.95**	**1%**	**3.00**
7.	**Phenol Red**	**0.02%**	**1.20**	**3.95**	**1%**	**3.00**
8.	**Cresol Red**	**0.02%**	**1.20**	**3.95**	**1%**	**3.00**
9.	**Phenol Phthalein (alc.)**	**0.02%**	**.95**	**2.10**	**1%**	**1.20**
10.	**Cresol Phthalein (alc.)**	**0.02%**	**1.20**	**3.00**	**1%**	**1.80**



5-990

COLOR COMPARATOR

for making tests with Hydrogen-Ion Indicators No. 5-975 to No. 5-990, see Cooledge Color Comparator No. 7-360.

5-995

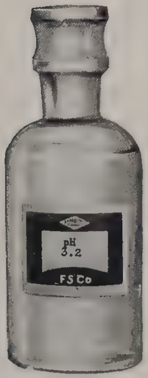
5-990. BUFFER SALTS, for the Preparation of Clark and Lubs Buffer Solutions and Buffer Mixtures. These Salts are supplied in sealed glass stoppered containers, ready for use.

No.	Buffer Salt	Formula	Price 100 gm.	Price 500 gm.
1.	**Potassium Chloride**	**KCL**	**$2.00**	**$ 7.80**
2.	**Potassium Acid Phthalate**	**$C_8H_4O_4HK$**	**2.65**	**10.80**
3.	**Potassium Acid Phosphate**	**KH_2PO_4**	**2.65**	**10.80**
4.	**Disodium Phosphate $2H_2O$**	**Na_2HPO_4**	**2.65**	**10.80**
5.	**Boric Acid**	**H_3BO_3**	**2.00**	**7.80**

5-995. BUFFER SOLUTIONS, Normality M-5. These Solutions are used for preparing the various buffer solutions of definite pH value. They are made from the BUFFER SALTS with neutral distilled water, and standardized for their salt content. Supplied in sealed glass stoppered bottles.

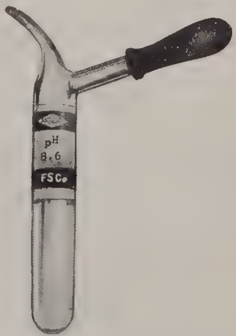
No.	Solutions, Normality M-5	Price 500 ml.	Price 1000 ml.
1.	**Potassium Chloride**	**$3.90**	**$6.00**
2.	**Potassium Acid Phthalate**	**3.90**	**6.00**
3.	**Potassium Acid Phosphate**	**3.90**	**6.00**
4.	**Disodium Phosphate**	**3.90**	**6.00**
5.	**Boric Acid**	**3.90**	**6.00**
6.	**Boric Acid-Potassium Chloride Mixture**	**3.90**	**6.00**
7.	**Sodium Hydroxide (CO_2 free)***	**5.40**	**7.80**
8.	**Hydrochloric Acid (Special)**	**3.90**	**6.00**
9.	**Sodium Citrate (Special)**	**3.90**	**6.00**

******Put up in sealed, glass stoppered bottle with paraffin lining.*



5-998 A

5-998 B



5-998 C

5-998. BUFFER MIXTURES, Standardized. These mixtures have been specially prepared so as to have a definite buffer action or pH value. They are all sterilized and supplied in 100 ml. glass stoppered bottles, or in sets of 9 plain ampoules of 10 ml. each, or in sets of 9 tubulated ampoules of 10 ml. each. The range of pH values is from 1.2 to 10.0 and can be supplied in increments of 0.2 pH. *In ordering specify pH values desired.*

A.	**Per 100 ml. Bottle,**	**$1.80**
B.	**Per set of 9 Plain Ampoules,**	**3.60**
C.	**Per set of 9 Tubulated Ampoules,**	**4.80**

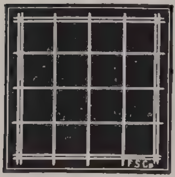
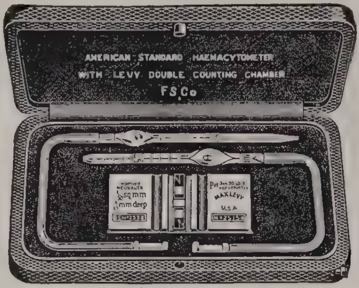


Fig. 1
Smallest divisions
greatly magnified


AMERICAN STANDARD HAEMACYTOMETER
WITH LEVY DOUBLE COUNTING CHAMBER
FSCo
MAX LEVY
U.S.A.

6-030 See also No. 6-025

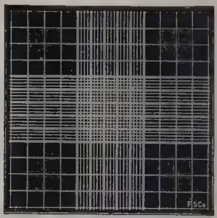


Fig. 2
Entire surface
Improved Neubauer Ruling

6-025. HAEMACYTOMETER SET, Levy, with Improved, Double-Neubauer Ruling; used for counting the red and white corpuscles of the blood. The combination of the improved Neubauer ruling with the double or "H-form" trench is very convenient and is increasing in popularity, because this style permits the making of two blood counts from the same drop, before cleaning and refilling the counting chamber.

The Levy counting chamber is made from a single piece of glass, without cemented parts. The trenches are ground into the glass and the depth of the chamber (0.1 mm.) is accurately measured. The supporting surfaces for the cover glass have a matte finish, which facilitates the correct adjustment of the cover glass. An indicating line on the chamber enables the operator to quickly locate the ruled area and assists in focusing the microscope. After the cover glass is in place, the open parallel trench construction causes capillary attraction to draw in the diluted blood, thereby filling evenly the chamber between the cover glass and the ruled area.

The Improved Neubauer Ruling is similar to the original Neubauer in that the central square millimeter is divided into squares, each of which has an area of 1/400 square millimeter. The improvement lies in the arrangement of these smaller squares into twenty-five (25) groups of sixteen each, instead of sixteen (16) groups of sixteen each. (See Fig. 1 and Fig. 2.) This is accomplished by means of a new split line, which, under the microscope, appears as a transparent border around each group of the smaller squares. For counting the red corpuscles, this improved arrangement of the smaller squares has been found to be much less confusing than the original style. For counting the white corpuscles, the four outside square millimeters, at the corners of the ruled area, are divided into sixteen squares, the same as in the original Neubauer ruling. The ruling of the Levy counting chambers is cut permanently into the glass, not etched.

The Neubauer ruling is now considered standard for blood cell counting and all other rulings have been discontinued at the suggestion of Morris and other haematologists, because the best features of all rulings are embodied in the Neubauer. (See *Journal of Laboratory and Clinical Medicine, December, 1916, Vol. 2, p. 208.*)

The Levy counting chamber, supplied with this haemacytometer, is sold with the guarantee that it comes within the tolerances established by the U. S. Bureau of Standards, Washington, D. C. If it is sent to the Bureau and is rejected, it will be replaced without charge. However, to those whose work requires a Certified Chamber, we recommend the purchase of one already in our stock, because this will save the user the usual delay of not less than two months, awaiting the return of the instrument from the Bureau. For Haemacytometers, with Certified Chambers, see No. 6-030.

This Haemacytometer Set is furnished complete in a velvet-lined, leather case. Included are the Levy Counting Chamber, with the Improved, Double-Neubauer Ruling; two (2) Cover Glasses, 20x26 mm.; and two (2) Thoma, Blood Diluting Pipettes, one for red and the other for white corpuscles.
Each, $17.00

6-030. HAEMACYTOMETER SET, Levy, Certified, with Improved, Double-Neubauer Ruling. This haemacytometer is the same outfit as No. 6-025, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part.

The seal shows that the apparatus has come within the tolerances established by the Bureau. The practice of specifying the exact error on the certificate has been discontinued, at the suggestion of the Bureau, because, in actual use, this error is negligible in all haemacytometers passing the Bureau's tests.
Each, $23.50

6-035. HAEMACYTOMETER SET, Levy, with Improved, Single-Neubauer Ruling. This haemacytometer outfit is similar to No. 6-025, except that the Levy Counting Chamber is made with one counting chamber, instead of two; and the Cover Glasses supplied measure 20x21 mm. **Each, $14.00**

6-040. HAEMACYTOMETER SET, Levy, Certified, with Improved, Single-Neubauer Ruling. This outfit is similar to No. 6-035 and has, in addition, been certified by the U. S. Bureau of Standards. **Each, $19.50**

6-045. COUNTING CHAMBER, Levy, with Improved, Double-Neubauer Ruling. This chamber is described fully under No. 6-025. It is supplied with two (2) Cover Glasses, 20x26 mm., without case.
Each, $10.00

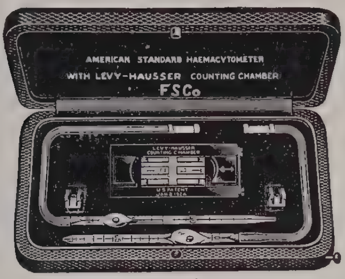
6-050. COUNTING CHAMBER, Levy, Certified, with Improved, Double-Neubauer Ruling. This chamber is similar to No. 6-045 and has, in addition, been certified by the U. S. Bureau of Standards. Without case.
Each, $14.00

6-055. COUNTING CHAMBER, Levy, with Improved, Single-Neubauer Ruling. The construction of this chamber is described under No. 6-035. It is supplied with two (2) Cover Glasses, 20x21 mm., without case. **Each, $7.00**

6-060. COUNTING CHAMBER, Levy, Certified, with Improved, Single-Neubauer Ruling. This chamber is similar to No. 6-055 and has, in addition, been certified by the U. S. Bureau of Standards. Without case.
Each, $10.00

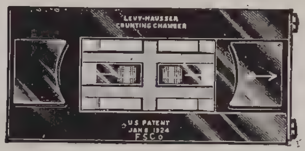
6-065. CASE, for Single-Ruled, Levy Counting Chamber; made of leather, velvet lined. **Each, $1.50**

6-070. CASE, for Double-Ruled, Levy Counting Chamber; made of leather, velvet lined. **Each, $1.50**


AMERICAN STANDARD HAEMACYTOMETER
WITH LEVY-HAUSSER COUNTING CHAMBER
FSCo

6-075

LEVY-HAUSSER
BAKELITE HOLDER



6-095

6-075. HAEMACYTOMETER SET, Levy-Hausser, with Improved, Double-Neubauer Ruling (See No. 6-025 for explanation of the improved ruling); used for counting the red and white corpuscles of the blood.

The Levy-Hausser counting chamber consists of a Bakelite Holder and a ruled Glass Slide, which, when clamped together, become practically an unbreakable unit, with the under surface of the glass slide protected from scratching. The Glass Slide can be taken out of the Bakelite Holder by opening the metal clamp at the end and removing the protecting Bakelite slide, as indicated by the arrow. This interchangeable construction provides the ready removal of the glass slide and permits the use of various ruled slides, Double-Neubauer, Single-Neubauer, Fuchs-Rosenthal or Helber Cell, all in the same Bakelite holder. When one kind of ruling only is being used, replacement, in case of breakage, can be made economically. The ruled glass slides cannot be used without the Bakelite Holder, because of their small size. The Bakelite Holder measures 75x38 mm. and fits on the microscope stage.

The ruled Glass Slide is constructed so that the Cover Glass is supported by four relatively small surfaces, with a matte finish, which make it easier to properly adjust the Cover Glass. For those who prefer to maintain a constant pressure between the ruled glass slide and the cover glass, two nickel-silver, spring Cover Glass Clips are furnished for this purpose. The clips are recessed in the Bakelite holder and do not come in contact with the microscope stage. The trenches are ground into the glass and the depth of the counting chamber (0.1 mm.) is accurately measured. An indicating line on the chamber enables the operator to readily locate the ruled area and assists in focusing the microscope. After the cover glass is in place, the open parallel trench construction causes capillary attraction to draw in the diluted blood, thereby filling evenly the chamber between the cover glass and the ruled area.

The Levy-Hausser ruled slide is sold with the guarantee that it is within the tolerances established by the U. S. Bureau of Standards, Washington, D. C. Any slides that are rejected after being sent to the Bureau for certification will be replaced without charge. However, to those whose work requires an instrument certified by the Bureau, we recommend the purchase of one already in our stock, because this saves to the user the usual delay of not less than two months, awaiting the return of the instrument from the Bureau. For Certified Levy-Hausser Haemacytometers, see No. 6-080.

The haemacytometer set is furnished complete in a velvet-lined, leather case. Included are the Levy-Hausser Counting Chamber, Improved, Double-Neubauer Ruling, with Bakelite holder; two (2) Cover Glasses, 20x26 mm.; two (2) Cover Glass Clips; and two Thoma Blood Diluting Pipettes, one for red corpuscles and the other for white corpuscles. **Each, $19.00**

6-080. HAEMACYTOMETER SET, Levy-Hausser, Certified, with Improved, Double-Neubauer Ruling. This is the same outfit as No. 6-075, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part.

The seal shows that the apparatus has come within the tolerances established by the Bureau. The practice of specifying the exact error on the certificate has been discontinued, at the suggestion of the Bureau, because, in actual use, this error is negligible in all haemacytometers passing the Bureau's tests. **Each, $25.50**

6-085. HAEMACYTOMETER SET, Levy-Hausser, with Improved, Single-Neubauer Ruling. This haemacytometer outfit is similar to No. 6-075, except that the Levy-Hausser Counting Chamber is made with one counting chamber, instead of two; and the Cover Glasses supplied measure 20x21 mm. **Each, $17.00**

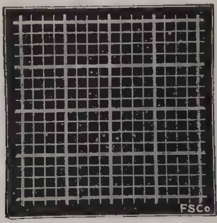
6-090. HAEMACYTOMETER SET, Levy-Hausser, Certified, with Improved, Single-Neubauer Ruling. This outfit is similar to No. 6-085, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part. **Each, $22.50**

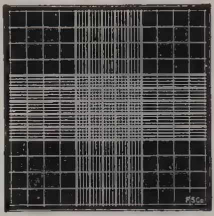
6-095. COUNTING CHAMBER, Levy-Hausser, with Improved, Double-Neubauer Ruling, including the Bakelite Holder, 75x38 mm.; Ruled Glass Slide; two (2) Cover Glasses, 20x26 mm.; and two (2) Cover Glass Clips. Without case. (For description of ruling, see No. 6-025.) **Each, $12.00**

6-100. COUNTING CHAMBER, Levy-Hausser, Certified, with Improved, Double-Neubauer Ruling. This chamber is similar to No. 6-095, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part. Without case. **Each, $16.00**

6-105. COUNTING CHAMBER, Levy-Hausser, with Improved, Single-Neubauer Ruling, including the Bakelite Holder, 75 mm. x 38 mm.; Ruled Slide; two (2) Cover Glasses, 20 x 21 mm.; and two (2) Cover Glass Clips. Without case. **Each, $10.00**

6-110. COUNTING CHAMBER, Levy-Hausser, Certified, with Improved, Single-Neubauer Ruling. This chamber is similar to No. 6-105, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part. Without case. **Each, $13.00**


Fuchs-Rosenthal Ruling
6-115

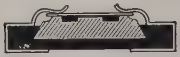

Ruling for Helber Cell
6-125

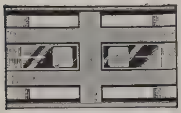
6-115. COUNTING CHAMBER, Levy-Hausser, with Single Fuchs-Rosenthal Ruling. This chamber is used in cerebro-spinal work and has a depth of 0.2 mm. A Bakelite Holder, 75x38 mm.; Ruled Glass Slide; two (2) Cover Glasses, 20x21 mm.; and two (2) Cover Glass Clips are included. Without case. **Each, $10.00**

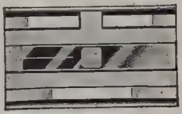
6-120. COUNTING CHAMBER, Levy-Hausser, Certified, with Single Fuchs-Rosenthal Ruling. This chamber is similar to No. 6-115, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part. Without case. **Each, $13.00**

6-125. COUNTING CHAMBER, with Helber Cell, Levy-Hausser; used for counting blood platelettes and for controlling bacteria in vaccines by the counting method. Included with the counting chamber are a Bakelite holder, 75x38 mm. and a No. 6-245 Reinforced Precision Cover Glass. This cover glass is made extra thin (0.18 mm. thick) so that it can be used satisfactorily with a homo-immersion microscope objective. The ruling on the glass slide is single and of the improved Neubauer type, as used in counting blood corpuscles, but the depth of the chamber is only 0.02 mm. Because of the shallowness of the chamber only the reinforced Precision Cover Glass can be used to obtain the necessary short distance required by the microscope objective for a sharp focus. Without case. **Each, $18.00**

6-130. COUNTING CHAMBER, with Helber Cell, Levy-Hausser, Certified. This counting chamber is similar to No. 6-125, with the addition of the U. S. Bureau of Standards Certificate and the Bureau's seal on each separate part. Without case. **Each, $21.00**


Showing clips in position


6-135


6-145

6-175

6-135. GLASS SLIDE, Levy-Hausser, with Improved, Double-Neubauer Ruling, with two (2) Cover Glasses, 20x21 mm. This glass slide can be used only with the Levy-Hausser Bakelite Holder and slides. Slide, under this number, is intended for replacement only, where the user already is provided with the Bakelite holder. Ruled glass slide only. **Each, $8.00**

6-140. GLASS SLIDE, Levy-Hausser, Certified, with Improved, Double-Neubauer Ruling. This slide is similar to No. 6-135, with the addition of the U. S. Bureau of Standards certificate. Ruled glass slide only. **Each, $12.00**

6-145. GLASS SLIDE, Levy-Hausser, with Improved, Single-Neubauer Ruling, with two (2) Cover Glasses, 20x26 mm. This glass slide can be used only with the Levy-Hausser Bakelite Holder and slides. Slide, under this number, is intended for replacement only, where the user already is provided with the Bakelite holder. Ruled glass slide only. **Each, $6.00**

6-150. GLASS SLIDE, Levy-Hausser, Certified, with Improved, Single-Neubauer Ruling. This slide is similar to No. 6-145, with the addition of the U. S. Bureau of Standards certificate. Ruled glass slide only. **Each, $9.00**

6-155. GLASS SLIDE, Levy-Hausser, with Single Fuchs-Rosenthal Ruling, with two (2) Cover Glasses, 20x21 mm. This glass slide can be used only with the Levy-Hausser Bakelite Holder and slides. Slide, under this number, is intended for replacement only, where the user already is provided with the Bakelite holder. Ruled glass slide only. **Each, $6.00**

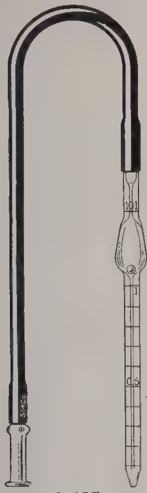
6-160. GLASS SLIDE, Levy-Hausser, Certified, with Single Fuchs-Rosenthal Ruling. This slide is similar to No. 6-155, with the addition of the U. S. Bureau of Standards certificate. Ruled glass slide only. **Each, $9.00**

6-165. GLASS SLIDE, with Helber Cell, Levy-Hausser, with one (1) No. 6-245 Reinforced Precision Cover Glass. This slide can be used only with the Levy-Hausser Bakelite Holder and slides. Slide, under this number, is intended for replacement only, where the user already is provided with the Bakelite holder. **Each, $14.00**

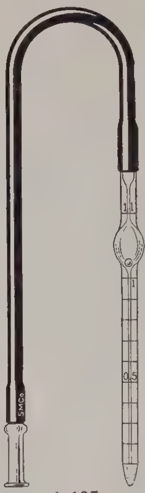
6-170. GLASS SLIDE, with Helber Cell, Levy-Hausser, Certified. This slide is similar to No. 6-165, with the addition of the U. S. Bureau of Standards certificate, with No. 6-245 Precision Cover Glass. **Each, $17.00**

6-175. COVER GLASS CLIPS, Levy-Hausser, of nickel-silver; used to hold the cover glass on the Levy-Hausser glass slide in the Bakelite holder. **Per pair, $ .50**

6-180. CASE, for Levy-Hausser Counting Chambers; of leather, velvet-lined. The case is large enough to include the Bakelite holder. **Each, $1.50**



6-185



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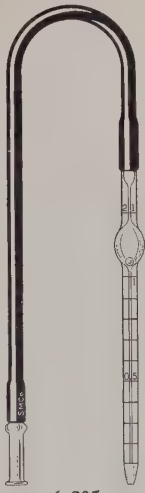

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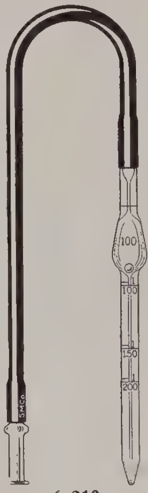

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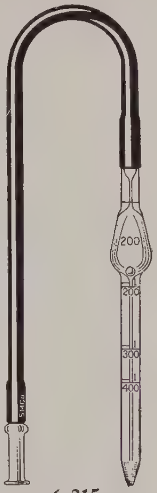


6-215

6-185. **BLOOD DILUTING PIPETTE, Thoma, for red corpuscles,** for diluting 1 to 100 and 1 to 200. Supplied with mouth-piece and rubber tubing, which is heavy enough to resist collapse during suction and long enough to permit a direct view of the graduation marks, without parallax error. The rubber tubing is 10 inches long. **Each, $1.50**

6-190. **BLOOD DILUTING PIPETTE, Thoma, for red corpuscles, Certified,** with U. S. Bureau of Standards' control stamp. Instead of a certificate stating the exact error, the Bureau now engraves the initials "B.S." and the year on each pipette passing their tests. In actual use, the errors in pipettes, with the Bureau's control stamp, are negligible. **Each, $2.75**

6-195. **BLOOD DILUTING PIPETTE, Thoma, for white corpuscles,** for diluting 1 to 10 and 1 to 20. Supplied with mouth-piece and rubber tubing which is heavy enough to resist collapse during suction and long enough to permit a direct view of the graduation marks, without parallax error. The rubber tubing is 10 inches long. **Each, $1.50**

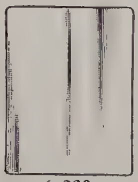
6-200. **BLOOD DILUTING PIPETTE, Thoma, for white corpuscles, Certified,** with U. S. Bureau of Standards' control stamp. (See note under No. 6-190 regarding control stamp.) **Each, $2.75**

6-205. **BLOOD DILUTING PIPETTE, Rieder,** for diluting 1 to 20; supplied with mouth-piece and 10 inches of rubber tubing. **Each, $3.00**

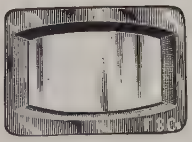
6-210. **BLOOD DILUTING PIPETTE, Miescher-100;** for diluting 1 to 100, 1 to 150 and 1 to 200; supplied with mouth-piece and 10 inches of rubber tubing. **Each, $4.00**

6-215. **BLOOD DILUTING PIPETTE, Meischer-200;** for diluting 1 to 200, 1 to 300 and 1 to 400; supplied with mouth-piece and 10 inches of rubber tubing. **Each, $4.00**

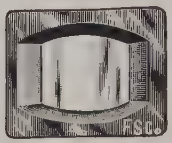
6-225



6-230



6-240



6-245

6-220. **HAEMACYTOMETER COVER GLASS, for single blood-counting chambers, 20x21 mm.** Ordinary micro cover glasses should not be used with haemacytometers because of their thickness and unevenness of surface. This haemacytometer cover glass is optically plane and from 0.4 to 0.6 mm. thick. Cover glasses more than 0.6 mm. thick usually interfere with the working distance of 4 mm. (1/6 inch) required for microscope objectives with 0.65 N. A., usually used for blood counting work. (*Objectives of 4 mm. focus and 0.85 N. A. are not suitable for blood counting because of their short working distance.*) **Each, $ .50**

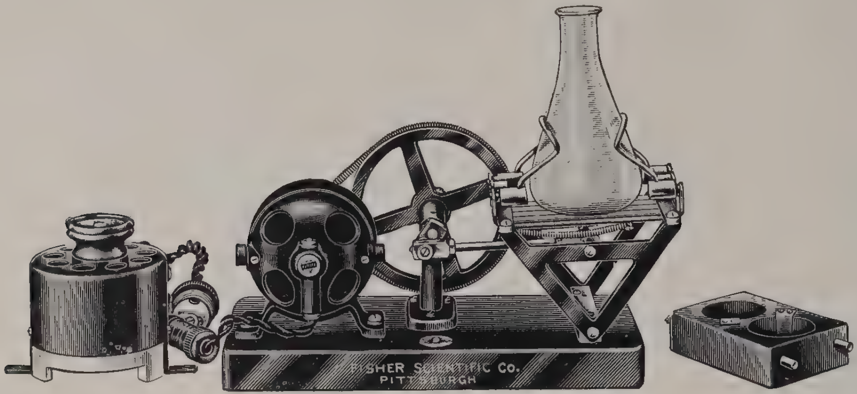
6-225. **HAEMACYTOMETER COVER GLASS, 20x21 mm., Certified.** This cover glass has been tested by the U. S. Bureau of Standards and has received the official control stamp. **Each, $ .75**

6-230. **HAEMACYTOMETER COVER GLASS, for double blood-counting chambers, 20x26 mm.** (See note under No. 6-220 regarding thickness, etc.) **Each, $ .50**

6-235. **HAEMACYTOMETER COVER GLASS, 20x26 mm., Certified.** This cover glass has been tested by the U. S. Bureau of Standards and has received the official control stamp. **Each, $ .75**

6-240. **HAEMACYTOMETER COVER GLASS, Precision, Hausser Reinforced,** 20x29 mm., with transparent area 14x20 mm. and 0.4 mm. thick. The under surface is guaranteed plane to within 0.001 mm. This precision cover glass can be used with any counting chamber having the usual 0.1 mm. depth of cell for blood counting work. **Each, $2.00**

6-245. **HAEMACYTOMETER COVER GLASS, Precision, for Helber Cell, Hausser Reinforced,** 20x26 mm., with transparent area 12x12 mm. and 0.18 mm. thick. The under surface is guaranteed plane within 0.002 mm. This precision cover glass is the only one recommended for use with the Helber Cell, because its extreme thinness is necessary to obtain a sharp focus when used with 1.9 mm. oil immersion microscope objectives, when counting blood platelettes and bacteria. **Each, $2.00**



6-250

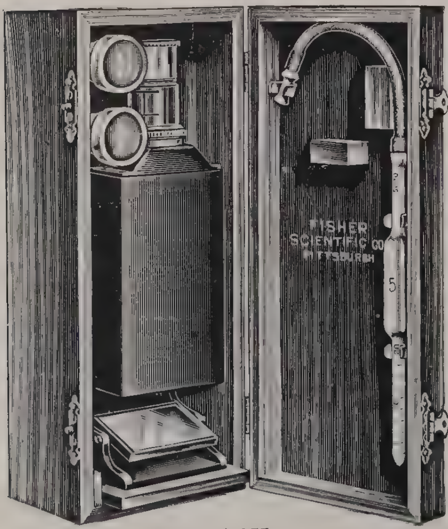
6-250. SHAKING APPARATUS, Clinical, for mechanically shaking and mixing small quantities of liquids in clinical extractions, dilutions, blood counts, etc. See *Haden, "Clinical Laboratory Methods," 93 (1922).*

The apparatus consists of a motor, speed reducing pulley, and a container rack. The motor is universal and operates on either 110 volts A. C. or D. C., 60 cycle. A rheostat in the feed line controls the speed. The speed reducing pulley is mounted on a separate shaft and is driven by the motor by means of a spring belt, which takes up the slack at all times. The container rack, by means of various clamps, can be arranged to hold haemacytometer pipettes, test tubes 120 mm. long, two-ounce sample bottles or a 250 ml. Erlenmeyer flask.

Supplied complete, with accessory clamps, together with cord and plug for attaching to lamp socket.

Each, $65.00

6-255. HAEMOGLOBINOMETER, B and L., Newcomer Method, a precision instrument for determining the per cent of haemoglobin in the blood, reading directly the per cent of haemoglobin to 5 per cent with very little manipulation and providing for the easy estimation of the haemoglobin content to 1 per cent.



6-255

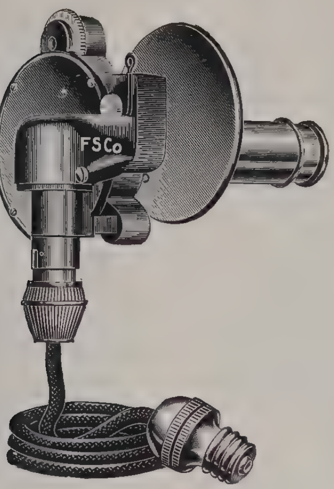
The basis on which the instrument is constructed is the photometric match between a standard glass filter on one side and the diluted blood sample on the other. The filter, of special yellow glass, was carefully selected by Dr. H. S. Newcomer of the University of Pennsylvania who discusses the theory of this Haemoglobinometer in the Journal of Biological Chemistry, XXXVII, 1919, p. 465. The 100 per cent of the scale is determined by the Normal Value of Williamson, 16.92 grams per 100 ml. (*Arch. Int. Med., XVIII, 1916, p. 505*).

The prism system is of the double rhomboid style, the same as used in all B. & L. colorimeters, the inner reflecting surfaces of both rhomboids being silvered. The special yellow glass filter, 22x22 mm., selected for its spectral properties, is introduced into the left hand light path in a recess provided at the upper end of the plunger mount. The thickness of the filter is controlled to 0.01 mm. The scale is calibrated so that the haemoglobin values are in steps of 5 per cent. The length of these divisions makes it possible to estimate easily the haemoglobin value to 1 per cent. In addition to the feature of accuracy, the drum on which the scale is engraved offers an excellent reading device because the exact per cent can be read directly upon shifting the eye slightly from its position of observation of the field.

This haemoglobinometer is an adaptation of the Duboscq type of colorimeter, with cups having a fluid depth of 37.5 mm., and an overall depth of 47.5 mm. including the flared tops, which prevent overflow, even when the plungers are brought in contact with the bottoms of the cups. The plungers are made of hollow tubing with both ends closed to protect against dust entering. The body is of aluminum. The rack and pinion actuating the cup table is of the precision microscope type, both cups being operated by the same pinion.

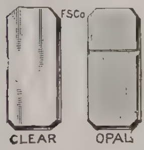
Each instrument is equipped with a measuring pipette containing 5 ml. graduated to give dilutions 1 to 500 or 1 to 250. The scale is calibrated for 1 to 500 and the dilution 1 to 250 is used only where the blood to be examined is very low in haemoglobin content. A slip cover of metal is provided for protection of the cups from extraneous light and the instrument from dirt when not in use. The whole outfit is supplied in a wooden case.

Each, $50.00



6-260
See also No. 6-275

HAEMOGLOBINOMETER
PIPETTE PLATES



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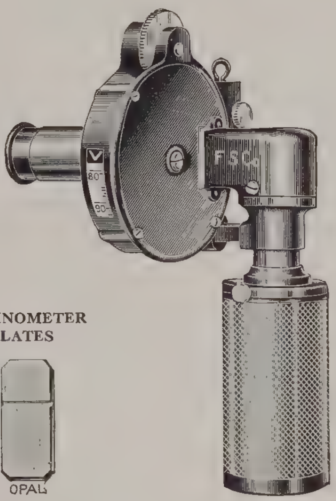


6-265
See also No. 6-270

6-260. **HAEMOGLOBINOMETER, Dare, Electric Illumination, for 110 volt current;** for measuring the percentage of haemoglobin in the blood. In this instrument, the color of a thin film of undiluted blood, illuminated by a standard light, is compared with a graduated color scale. The advantage claimed for this method is, that, while only a small drop of fluid is needed for its application, this drop is of pure blood, undiluted with artificial serum. The technic and possible errors of measuring, dilution and color diffusion are entirely eliminated. The scale of the haemoglobinometer cannot be seen during the comparison of the unknown sample with the standard color prism and the result obtained is free from outside influence. The entire examination may be completed in two minutes.

Leucocytosis, which is a frequent source of error in haemoglobin estimations, imparts a turbidity to mixtures of blood and water. In the Dare Haemoglobinometer, this becomes invisible when viewed by transmitted light against a white background. The opacity, due to the increase in number of the leucocytes, is imperceptible and only the red color of the haemoglobin can be seen.

The pipette, for holding the sample, consists of one small piece of flat clear glass and one similar piece of opal white glass, the latter of which is grooved to receive the blood sample, which is introduced by capillary attraction. The construction of the haemoglobinometer is such that it can be held in the hand and has the advantage of making examinations entirely in camera.

Furnished in a velvet-lined case, complete with blood lancet and blood collecting pipette, together with rheostat, cord and plug, for use on 110 volts A. C. **Each, $39.00**

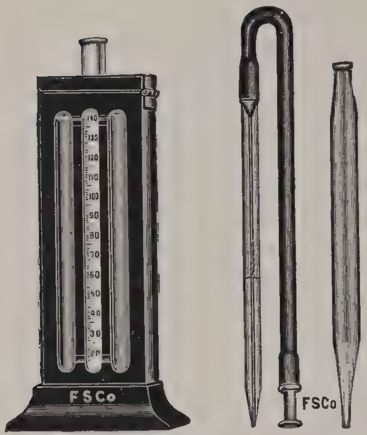
6-265. **HAEMOGLOBINOMETER, Dare, Electric, with Battery in Handle,** similar to No. 6-260 except that illumination is supplied by an electric lamp obtaining its current from an Eveready Battery No. 709 contained in the handle. A button circuit-breaker permits the operator to illuminate only when the haemoglobinometer is in actual use and as many as 250 blood examinations have been made without renewing the battery. For accuracy of comparison, the eye should be rested every 10 or 12 seconds. By pressing or releasing the button, illuminating or darkening the field becomes a simple operation. The battery handle is a recent improvement which enables a quick and accurate method for determination of haemoglobin in the blood. **Each, $39.00**

6-270. **BATTERY HANDLE, for Dare Haemoglobinometer,** complete with all necessary parts for adaptation to any Dare Haemoglobinometer now in use. This affords an opportunity for any, who have models with other means of illumination, to obtain the new improvement without buying a whole new instrument. **Each, $10.00**

6-275. **HAEMOGLOBINOMETER, Dare, Candle Illumination;** similar to No. 6-260, but with a standard photometric candle as the source of illumination. This is the original form of the Dare Haemoglobinometer.

Supplied in a velvet-lined case, complete with automatic blood collecting pipette, blood lancet and photometric candle. **Each, $30.00**

6-280. **AUTOMATIC PIPETTE, for Dare Haemoglobinometer,** consisting of two pieces of flat glass, 10x25 mm., one clear and the other opal (milk white), the latter of which is grooved to receive the blood sample which is introduced by capillary attraction when the two pieces of glass are put together. **Per set, $1.75**



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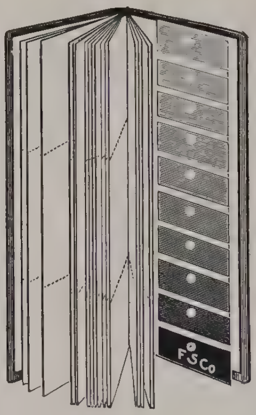

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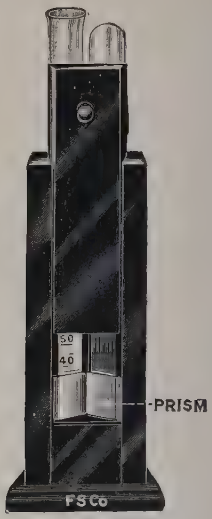


6-320
See also No. 6-325

6-285. HAEMOMETER, Sahli, Nonfade, with Glass Standards, for the determination of the haemoglobin content of blood, calibrated so that 100 per cent is normal for man and 90 per cent for woman. The new glass standards cannot fade and the results are accurate to about 5 or 10 per cent.

The glass color standards are mounted in a metal housing provided with a hinged cover to prevent them falling out. The graduated percentage tube, calibrated to read directly in percentage of haemoglobin up to 140 per cent, is mounted between the two standards so as to make comparison easier and more accurate.

The technique consists of measuring 20 cubic millimeters of pure blood and mixing this with ten times the amount of 1/10 normal hydrochloric acid in the graduated percentage tube and continuing to dilute the solution, by means of the diluting pipette, until the color is of the same intensity as that of the haemoglobin color standard. The percentage of haemoglobin in the blood can then be read directly on the scale of the graduated diluting tube.

Supplied with metal housing; two solid glass "nonfade" haemoglobin color standards; measuring pipette, graduated to 20 cubic millimeters; percentage tube, graduated to 140 per cent; diluting pipette, ungraduated; blood sample vial, in hard-rubber screw-top container; complete in velvet lined case, with directions for using. **Each, $10.00**

6-315. HAEMOGLOBIN SCALE, Tallquist, for estimating the haemoglobin content of the blood. This is a simple, quick method, without elaborate technique, and the results are approximately accurate.

The scale consists of a chart of ten (10) color plates, each with a 5 mm. hole in the center, through which the blood samples are viewed and compared with the color chart. The haemoglobin content is estimated by obtaining a sample of pure blood on one of the pieces of absorbing paper, supplied with the scale, and placing this under the holes in the various color plates, until the colors are matched. The color plates indicate a range of haemoglobin content between 10 per cent and 100 per cent. The colors are based upon the American Standard, viz., 100 per cent as normal for man and 90 per cent normal for woman.

The color charts and absorbing paper, sufficient for 150 tests, are put up in book form, 85 mm. x 200 mm., and can be carried in the pocket. **Each, $1.75**

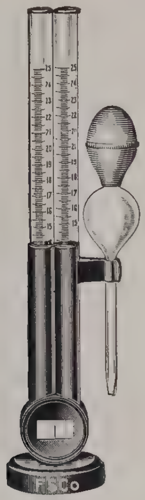
6-320. CLINICAL COLORIMETER, Kuttner-Micro, with prism, for the micro-chemical analysis of blood, urine and other physiological fluids. By means of the various color standards, a wide range of determinations in clinical diagnosis can be made. (For list of tests, see Color Standards, No. 6-325.)

The instrument consists of a closed upright box, 85 mm. high. There are two openings at the top, one for the color standard and the other for the graduated percentage tube containing the unknown. When the sliding door in the front is raised, a window is formed, through which the unknown is compared with the color standard. In this window there is a removable prism (Helmholtz double plates), which facilitates the comparison of the colors, because both the tubes appear close together, forming one continuous color band. The color standard and the graduated percentage tube are separated from each other by a partition, which prevents light being reflected from one tube to the other.

Supplied with colorimeter housing, of hard rubber, with prism; blood measuring pipette, graduated to 25 cubic millimeters, with mouth-piece and rubber tubing; three measuring pipettes, graduated respectively to 0.1 ml., 0.2 ml. and 2.0 ml.; two test tubes, graduated 10 ml. in 1/10 ml.; one diluting pipette, ungraduated; one percentage tube, graduated to 140 per cent (cubic millimeters); and pocket carrying case, with sufficient space for several color standards. The color standards are not furnished under this number, but are listed separately under No. 6-325. **Each, $22.00**

For Color Standards for No. 6-320, see page 207.

For other colorimeters, which also can be used for clinical applications, see Colorimeters No. 7-160 to No. 7-365.



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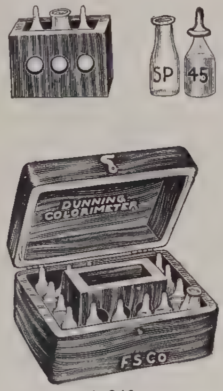

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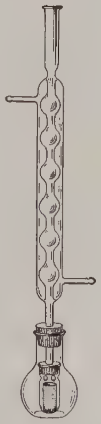


6-350

6-325. COLOR STANDARDS, for use with No. 6-320 Kuttner-Micro Clinical Colorimeter.

	Each
1. Haemoglobin (Standard Tube)	**$2.25**
2. Haemoglobin-Carbon Monoxide	**6.00**
3. Uric Acid in Urine	**1.75**
4. Uric Acid in Blood Standard Tube (1)	**1.50**
5. Uric Acid in Blood Standard Tube (½)	**1.50**
6. Sugar in Blood Standard Tube (A)	**1.50**
7. Sugar in Blood Standard Tube (B)	**1.50**
8. Phenolsulphonephthalein Standard Tube (1)	**1.50**
9. Phenolsulphonephthalein Standard Tube (2)	**1.50**
10. Phenolsulphonephthalein Standard Tube (3)	**1.50**
11. Creatin and Creatinine in Urine Standard Tube (1)	**1.50**
12. Creatin and Creatinine in Urine Standard Tube (2)	**1.50**
13. Creatinine in Blood Standard Tube (1)	**1.50**
14. Creatinine in Blood Standard Tube (2)	**1.50**

6-330. CLINICAL COLORIMETER, Myers Test-Tube, for the colorimetric estimation of urea, uric acid creatinine, blood sugar, renal functioning and acidity by the phenolsulphonephthalein tests. (For Method see "*Journal of Laboratory and Clinical Medicine,*" *V. 343,* (*1920*) and *Myers,* "*Practical Chemical Analysis,*" *206* (*1921*).

This is a simple colorimeter, of the dilution type, and consists of two glass tubes, each 25 ml. capacity, graduated from 5 ml. to 25 ml. in 1/10 ml. divisions. These tubes are carefully matched for diameter and color and are mounted in a black enameled support having a small window near the bottom. This window admits the light evenly to both tubes and insures equal illumination. Dilution is carried on by means of a pipette, with rubber bulb, which can be hung on the support, when not in use. Supplied complete, with one pair of matched tubes, one diluting pipette and black enameled support. **Each, $12.00**

6-335. MATCHED COLORIMETER TUBES, for Myers Test-Tube Colorimeter No. 6-330; capacity 25 ml., graduated from 5 ml. to 25 ml. in 1/10 ml. divisions. **Per pair, $3.20**

6-340. CLINICAL COLORIMETER, Dunning, for estimating the quantity of Phenolsulphonephthalein in urine excreted during the Rowntree and Geraghty Renal Function Test (Permeation Test). For Method, see *Simon,* "*Clinical Diagnosis,*" *688* (*1922*).

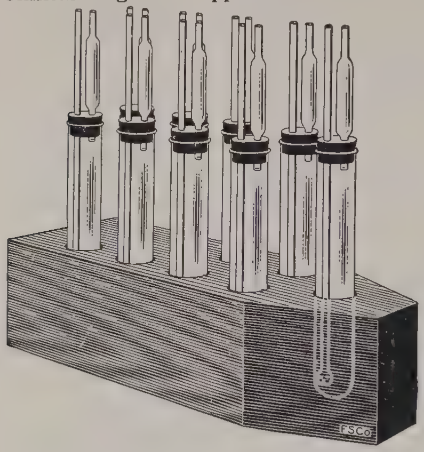
Apparatus consists of 13 sealed ampoules containing very stable color solutions used as standards and a color comparison box; all in a case (2½x3½x5 inches). The color of sample of the urine is compared with these standards, and the number on the tube matching the sample represents the percentage of the phthalein excreted. Dunning Colorimeter complete as described, in wooden case. **Each, $7.00**

6-345. PHENOLSULPHONEPHTHALEIN. For use in the Rowntree and Geraghty Test in conjunction with the No. 6-340 Dunning Colorimeter. Put up in sterile ampoules. **Per box** of 10 ampoules, **$1.25**

6-350. CHLORESTEROL EXTRACTION APPARATUS, Myers, for the determination of chloresterol in the blood. For Method, see *Myers,* "*Chemical Analysis of Blood,*" *128* (*1923*) and *Haden,* "*Clinical Laboratory Methods,*" *149* (*1923*), also *Myers-Wardell, Jour. Bio. Chem., XXXVI: 147* (*1918*). This apparatus lends itself to many extractions of a biological and clinical nature.

The apparatus consists of a 150 ml. extraction flask; a 300 mm. glass condenser, the inner tube of which is blown into bulbs to increase the condensing surface; and an extraction cartridge, supported in a perforated glass holder. The perforated glass holder has holes around the side, near the top, to permit the entrance of vapors from the extraction flask into the extraction cartridge and the condenser. The liquid condensed flows back through the cartridge and out through the holes in the bottom of the perforated holder. This makes for continuous extraction. **Each, $4.50**

For extra parts for No. 6-350 Chloresterol Apparatus, see page 208.



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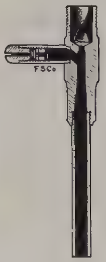

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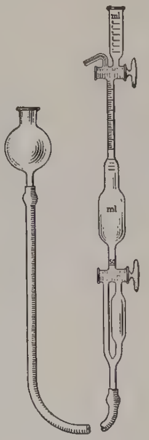

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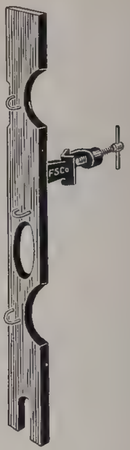


6-410

6-355. **EXTRACTION FLASK, for No. 6-350 Chloresterol Extraction Apparatus;** capacity 150 ml. **Each, $ .40**

6-360. **EXTRACTION CARTRIDGE, for No. 6-350 Chloresterol Extraction Apparatus;** 22 mm. diameter and 35 mm. high. **Each, $ .25**

6-365. **CARTRIDGE HOLDER, for No. 6-350 Chloresterol Extraction Apparatus;** made of glass, cup form, with perforations in the sides and bottom. **Each, $1.75**

6-370. **UREA APPARATUS, Van Slyke-Cullen,** for the determination of ammoniacal nitrogen or urea in blood, urine, spinal fluid, etc., by the urease fermentation method. For Method, see *Simon, "Clinical Diagnosis," 571 (1922).*

Apparatus consists of a wooden test tube rack for supporting nine tubes (200x30 mm.). This permits of the simultaneous analysis of four samples, each sample requiring two tubes, the extra tube serving as a wash bottle for the incoming air. Each tube is fitted with an inlet tube and an exit with a trap for separating any liquid entrained in the gases. Supplied complete, ready for attaching to suction pump, but without pump. **Each, $13.00**

6-375. **SUCTION PUMP, for use with No. 6-370 Urea Apparatus.** This pump is of the water injector type, but differs from the ordinary pump in that the stream of water is given a spiral motion, thereby entrapping the gases between the layers of water and effecting a "screw-conveyor effect." Pump is 4¾ inches long and is fitted with a ¼ inch I. P. thread, for attaching to a faucet coupling. Pump, without coupling for attaching to faucet. *For couplings, see Filter Pumps.* **Each, $1.60**

6-380. **TEST TUBES, Van-Slyke-Cullen, for use with No. 6-370 Apparatus;** made of glass, 200 mm. long and 30 mm. diameter. Nine of these tubes are supplied with the No. 6-370 outfit. Extra tubes should be ordered under this number. Supplied without rubber stoppers. **Each, $ .35**

6-385. **AERIATION TUBE, for use with No. 6-370 Apparatus;** made of glass, with perforated bulb at one end; used as inlet tube. Length, 12 inches. **Each, $ .50**

6-390. **OUTLET TUBE, for use with No. 6-370 Apparatus;** made of glass, with bulb in center; length, 6 inches over all. **Each, $ .40**

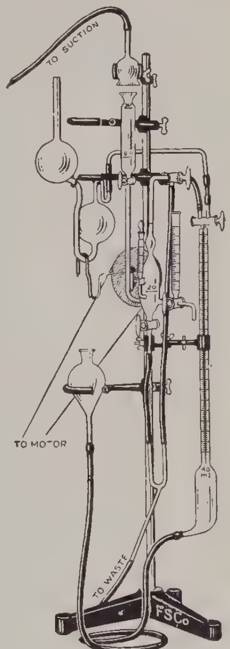
6-395. **BLOOD GAS APPARATUS, Van Slyke-Stadie;** for the determination of the Carbon Dioxide, Carbon Monoxide and Oxygen combining power of blood; for the determination of the absorptive power of the blood in cases of nephritis, diabetes, acidosis, pulmonary congestion, carbon monoxide poisoning, etc., and for the determination (volumetric) of the haemoglobin content. For discussion and methods, see *Journal of Biological Chemistry, 50: 49 (1921); Haden, "Clinical Laboratory Method," 165 (1924);* and *Myers "Practical Chemical Analysis of Blood," 158 (1923).*

The apparatus consists of a bulb type burette of 50 ml. capacity, with the upper portion graduated from zero down to 1 ml. in 0.02 ml. divisions and a slightly wider portion graduated from 1 ml. to 3 ml. in 0.5 divisions. At the upper end of the burette, is a three-way stopcock, one branch of which is capillary and serves to connect the burette with the absorbing solution. The other branch is fitted with a cylindrical receiver, which holds 6 ml., graduated in 1 ml. divisions. The lower end of the burette is fitted with another three-way stopcock, one branch of which is enlarged to serve as a collecting chamber, while the other serves as a by-pass for the first branch. Both branches are connected at their lower to a common delivery tube, for connecting apparatus with the leveling bulb. Supplied with burette, leveling bulb and 3 feet of special tubing, which is not affected by mercury. **Each, $12.00**

6-400. **BURETTE, only, for No. 6-395 Blood Gas Apparatus;** capacity 50 ml.................... **Each, $10.00**

6-405. **LEVELING BULB, only, for No. 6-395 Blood Gas Apparatus;** capacity about 125 ml. Supplied under this number without rubber tubing. **Each, $ .75**

6-410. **HOLDER, of wood,** for holding the No. 6-400 Burette. This is a wooden frame with openings to take this burette; provided with clamps for attaching the burette to the frame. A support-clamp in the middle of this holder enables it to be attached to the usual support rod. **Holder only, $3.50**



6-415
See also No. 6-440 and No. 6-445

6-415. DEAMINIZING APPARATUS, Van Slyke Macro, for the volumetric determination of aliphatic amino groups. This apparatus has a wide use in the analysis of blood, urine, animal tissues, in fact anything of a protein nature. It can be applied to various problems of protein digestion, both in vitro and vivo, determination of the nature of the amino acids yielded by hydrolysis of small amounts of protein, determination of free amino groups as a means of establishing the chemical constitution of various organic substances, and permits of the utilization of a single sample for a series of determinations. The apparatus permits of the analysis of any volume of solution up to 10 ml. with an accuracy of about 1/20 milligram of nitrogen. For use, see *Journal of Biological Chemistry, 12, 275 (1911) and subsequent numbers.*

The **Deaminizing Unit** consists of a central volumeter, graduated at 20 ml. and 44.5 ml. Four branches are attached to the sides and bottom of the central volumeter. The branch at the bottom has a stopcock, which serves as a drain cock for the unit. One branch is connected through a stopcock to a charging reservoir graduated at 8.9 ml. and 35.6 ml. The second side branch is connected through a stopcock to a glass stoppered measuring tube of one (1) ml. capacity, graduated in 1/20 ml. divisions. Another branch is connected through a three-way stopcock to an open measuring tube of 10 ml. capacity, graduated in 1/20 ml. divisions. The other arm of the stopcock is connected to the leveling bulb.

The **Burette** has a blue-line (Schellbach) back, with a three-way stopcock on top and a bulb at the bottom. The constricted portion is graduated from zero to 40 ml. in 1/10 ml. divisions.

The **Absorption Pipette** is of the Hempel, bulb type, heavy walled, about 3 inches in diameter and so designed so it can readily be suspended in the supporting rack and attached to the shaking device.

The Apparatus is supplied, mounted on a heavy tripod support, with special clamps for holding the various glass parts; with speed reducing pulley and connecting rod, arranged so that either the deaminizing unit or the absorption pipette can be shaken. The motor is not supplied under this number. For motor, to operate shaking device, see No. 6-440.
Apparatus as described, **without motor, $39.00**

6-420. DEAMINIZING UNIT, for No. 6-415 Van Slyke Macro Apparatus; capacity of central volumeter, 44.5 ml. **Each, $20.00**

6-425. BURETTE, for No. 6-415 Van Slyke Macro Apparatus; capacity 40 ml., in 1/10 ml. divisions, with blue-line back and three-way stopcock, without leveling bulb. **Each, $7.00**

6-430. LEVELING BULB. For Burette; for use with No. 6-425 Van Slyke Macro Burette; capacity 250 ml. without rubber tubing. **Each, $1.20**

6-435. ABSORPTION PIPETTE, for No. 6-415 Van Slyke Macro Apparatus, with two bulbs about 3 inches diameter. **Each, $3.50**

6-440. MOTOR, for No. 6-415 Van Slyke Macro Apparatus. The motor will develop 1/30 H. P. at 6000 r. p. m., under full load. This speed can be slowed down by means of a rheostat, contained in the base. It can be connected, by a cord or a belt made of elastic bands, with the speed reducing pulley on the No. 6-415 Apparatus. The housing of the motor is attached to a hinged joint in the base which makes it possible, by a thumb screw adjustment, to tilt the motor to any desired position from horizontal to vertical, so as to accommodate the driving belt to the Van Slyke apparatus. The motor is wound for either 110 volt D. C. or A. C., 25 to 60 cycle, and is supplied with grooved pulleys, electric cord and plug, ready for attaching to any lamp socket. This motor can also be used with No. 6-445 Van Slyke Micro Apparatus. **Each, $23.00**

6-445. CLINICAL DEAMINIZING APPARATUS, Van Slyke Micro, for the volumetric determination of aliphatic amino groups, when only small amounts of substance are available for analysis. This apparatus is similar to No. 6-415 Macro Apparatus, but is of smaller size, permitting a complete analysis to be made with 2 ml. of material.

The **Deaminizing Unit** consists of a central volumeter, graduated at 4.0 ml. and 12.5 ml. The charging reservoir is graduated at 2.5 ml. and 10.0 ml. One side-branch is connected through a stopcock to a glass stoppered measuring tube of two (2) ml. capacity, graduated 1/20 ml. divisions. Another branch is connected through a three-way stopcock to an open measuring tube of 2 ml. capacity, graduated in 1/20 ml. divisions. The other arm of the stopcock is connected to the leveling bulb.

The **Burette** is made of clear glass tubing, with a three-way stopcock on top and a bulb at the bottom. The constricted portion is graduated from zero to 3 ml. in 1/100 ml. divisions. The **Absorption Pipette** is the same as for the No. 6-415 Macro Apparatus. (For extra absorption pipette, see No. 6-435.)

The Apparatus is supplied, mounted on a heavy tripod support, with special clamps for holding the various glass parts; with speed reducing pulley and connecting rod, arranged so that either the deaminizing unit or the absorption pipette can be shaken. The motor is not supplied under this number. For motor to operate shaking device, see No. 6-440. Apparatus as described, **without motor, $39.00**

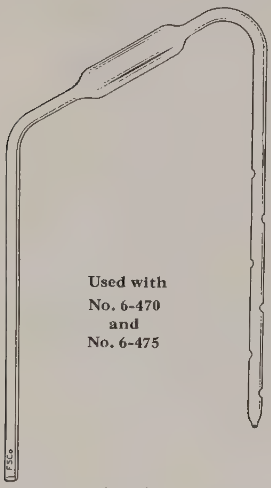
6-450. DEAMINIZING UNIT, for No. 6-445 Van Slyke Micro Apparatus; capacity of central volumeter 12.5 ml. **Each, $20.00**

6-455. BURETTE, for No. 6-445 Van Slyke Micro Apparatus; capacity 3 ml., in 1/100 ml. divisions; made of clear glass tubing, with three-way stopcock. **Each, $7.00**

6-460. LEVELING BULB. For Burette; for use with No. 6-455 Van Slyke Micro Burette. Capacity 125 ml.; without rubber tubing. **Each, $ .75**

Clinical Diagnostic Apparatus

See also No. 6-490 and No. 6-495



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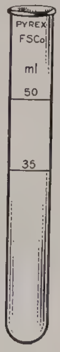
6-465



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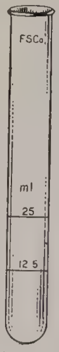

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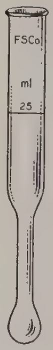
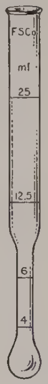


6-480



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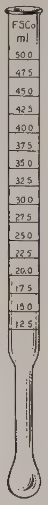
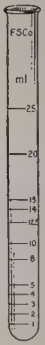


6-500



6-505

6-465. **DISTILLING TUBE, Watson-White,** used for distilling over ammonia in the Folin-Wu Method for determining urea in the blood. See *"Journal of Biological Chemistry," No. 45: 3, (1921).*

The tube is made approximately 265 mm. high over all and the distance between the arms is 135 mm. The six small holes on the generating side break up the large bubbles of foam and the bulb acts as a trap, preventing any of the liquid passing into the receiver. This distilling tube can be used effectively with digestion tube No. 6-470 and receiving tube No. 6-475.

Distilling tube, alone, without digestion tube or receiving tube. **Each, $1.50**

6-470. **BLOOD DIGESTION TUBE, Folin, Pyrex Glass,** graduated at 35 ml. and 50 ml. This tube is used in connection with Receiving Tube No. 6-475 in Micro-Kjeldahl digestions of blood filtrates in determining the non-protein nitrogen in the blood; also, for determining urea in blood by the urease and aeration method and by the autoclave decomposition method. See *Jour. of Bio. Chem. (1919), No. 38: 87.*

The length is 200 mm. and the outside diameter 25 mm. **Each, $ .75**

6-475. **RECEIVING TUBE, Folin,** made of resistant glass, and graduated at 12.5 ml. and 25 ml. This receiving tube is used in connection with Digestion Tube No. 6-470 in Micro-Kjeldahl determinations. See *Jour. of Bio. Chem. (1919), No. 38: 87.* It can also be used as an amino acid tube in Folin's newer method and as a blood sugar tube in the Lewis-Benedict method. See *Jour. of Bio. Chem. (1915), No. 20: 61.*

The length is 200 mm., and outside diameter 25 mm. **Each, $ .45**

6-480. **BLOOD SUGAR TUBE, Folin-Wu;** made according to the authors' specifications, to be used in the newer methods of blood chemistry for the determination of sugar in blood and creatine plus creatinine. See *Jour. of Bio. Chem., (1920), No. 41: 372.*

The tube is made of resistant glass, with slightly flared top, and graduated at 25 ml. with the graduation mark etched entirely around the tube. The design is such that 4 ml. of the alkaline solution will fall in the lower half of the parallel constriction. The length over all is 200 mm. and the outside diameter 22 mm. **Each, $ .45**

6-485. **BLOOD SUGAR TUBE, Kramer-Gittleman.** This is a modification of the original Folin-Wu tube and is used for the determination of sugar in blood, when the quantity obtainable is as small as 0.05 ml. to 0.10 ml. See *Journal A.M.A., Oct. 6, 1923, p. 1181.*

The tube is made of resistant glass, with slightly flared top, and graduated entirely around the tube at 4 ml., 6 ml., 12.5 ml. and 25 ml. The length over all is 220 mm.; outside diameter 18 mm. **Each, $ .75**

6-490. **BLOOD MEASURING PIPETTE, for use with No. 6-485 Kramer-Gittleman Blood Sugar Tube.** Graduated at 0.05 ml., 0.1 ml. and 0.5 ml.; supplied with mouth-piece and rubber suction tubing, 250 mm. long. **Each, $1.20**

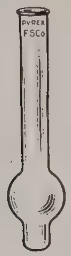
6-495. **TEST TUBE, Kramer-Gittleman, Pyrex,** with slightly flared top; 100 mm. long x 10 mm. diameter. Used in the Kramer-Gittleman Method along with No. 6-485 Sugar Tube for determining sugar in blood. **Each, $ .30**

6-500. **BLOOD SUGAR TUBE, Rothberg-Evans,** for the dilution of the blood filtrate in the Folin-Wu Method for the determination of sugar in blood. With this tube, a very accurate color comparison can be made. See *Journal of Biological Chemistry, Dec., 1923.*

The tube is 300 mm. long over all, and 20 mm. outside diameter. It is ungraduated up to 12.5 ml. and from there to 50 ml. it is graduated in 2.5 ml. divisions, with the marks running entirely around the tube. **Each, $1.00**

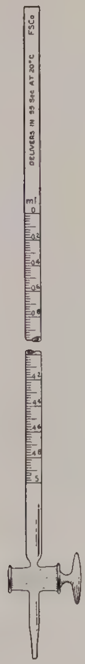
6-505. **BLOOD SUGAR TUBE, Combination, Nash.** Designed so that it can be used in the newer methods of blood and urine chemistry for any of the following determinations: Sugar in blood, Myers-Bailey and Lewis-Benedict Methods. See *Journal of Biological Chemistry (1918), No. 34: 203;* sugar in normal urine, Benedict-Osterberg Method, see *Journal of Biological Chemistry (1921), No. 47: 51,* and for the Benedict Method for uric acid in blood, see *Journal of Biological Chemistry (1922), No. 51: 187.*

The tube is made of resistant glass, with a slight flare at the top, and graduated at 1 ml., 2 ml., 3 ml., 4 ml., 5 ml., 8 ml., 10 ml., 12.5 ml., 14 ml., 15 ml., 20 ml., and 25 ml. The length over all is 200 mm. and the outside diameter 18 mm. Graduations run about one-third the way around the tube. **Each, $ .75**

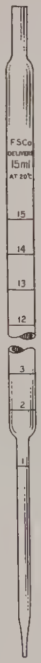


6-510

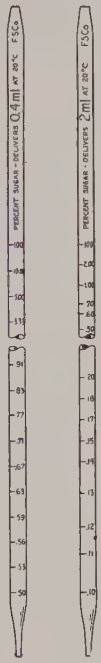
6-512
See also No. 6-513



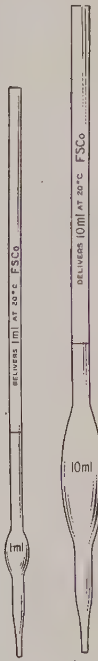
6-515



6-520


PERCENT SUGAR - DELIVERS 0.4ml AT 20°C FSCo
PERCENT SUGAR - DELIVERS 2ml AT 20°C FSCo

6-525



6-530

6-510. URINE SUGAR TUBE, Millard-Smith, Pyrex Glass, Ungraduated, with bulb near bottom. designed so that the tube below the bulb holds between 1.5 ml. to 2.0 ml., used in the micro-modification of the Benedict Method for the quantitative determination of reducing sugar in urine. See *Jour. of Lab. and Clin. Med. (1922), Vol. VII, No. 6, p. 364.* For Titration Pipettes to be used with this urine sugar tube, see No. 601-S. The tube is 150 mm. long and 18 mm. outside diameter, diameter of bulb about 35 mm. outside.
Each, $ .50

6-512. URINE SPECIMEN BOTTLE, with Blank Label-Caps. This bottle is specially designed for use as a urine specimen bottle. It is easily distinguished, because its name is embossed on the side. The bottle is made of heavy glass to withstand hard use and much re-use. On account of the wide mouth and sloping sides, this bottle is easily cleaned and sterilized. Capacity 200 ml.; height over all 155 mm. The caps are of heavy cardboard with handy lift-tabs. Each cap is printed and a space provided for writing the name of the patient, the room number and the date.

Original packages contain one gross (144) bottles and one thousand (1000) caps. On orders for bottles in dozen lots, fifty (50) caps are supplied for each dozen bottles.
Per dozen, $ 1.25
Per gross, $11.00

6-513. BOTTLE CAP, for No. 6-512 Urine Specimen Bottle. Made of heavy cardboard, with lift-tabs.
Per hundred, $ .25
Per thousand, $2.00

6-515. BURETTE, Folin, with stopcock, used for titrating undiluted urine to determine percentage of sugar. See *Jour. of Bio. Chem., March, 1918.* The capacity is 5.00 ml. and the graduation marks are every 0.02 ml. This burette can be read to 0.01 ml. The stopcock is designed to deliver 25 to 30 drops per ml.
Each, $4.50

6-520. PIPETTE, Folin-Wu, used for the preparation of protein-free blood filtrates. See *Jour. Bio. Chem., May (1919), No. 38, p. 81.* The pipette is calibrated from the tip to 15 ml. and graduated every 1 ml. The tip is made very long.
Each, $ .60

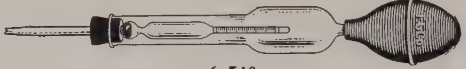
6-525. PIPETTES, Millard Smith, used for titrating in the micromodification of the Benedict Method for the quantitative determination of reducing sugar in urine. See *Jour. of Lab. and Clin. Med. (1922), Vol. VII, No. 6, p. 364.* The 0.4 ml. pipette is used for urines containing more than one (1) per cent sugar and the 2.0 ml. pipette for urines containing less than one (1) per cent. When using the 0.4 ml. pipette, it will not be necessary to dilute before titration, provided the sugar content is not more than three (3) per cent. These pipettes are graduated to read directly in per cent of sugar. For titrating tube, see No. 6-510.

Capacity, ml.	0.4	2.0
Each	**$ .80**	**1.00**

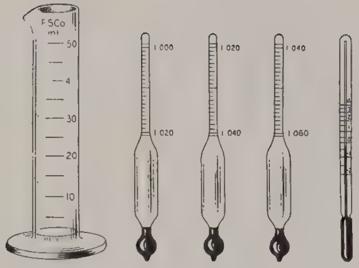
6-530. PIPETTES, Ostwald-Folin, accurately graduated to deliver the total volume by blowing out the last drop. The whole pipette is made of heavy capillary tubing and the tips are carefully fire-polished. This method of finishing the tips reduces the risk of chipping during sterilization. The pipettes are suitable for use in biochemistry and are recommended in the newer methods of blood and urine analysis.

To deliver, ml.	1	2	3	5	10
Each	**$ .50**	**.55**	**.60**	**.65**	**.70**

Clinical Diagnostic Apparatus



6-540



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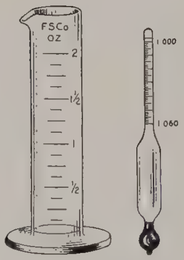
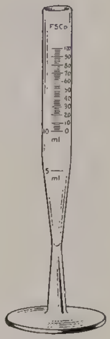
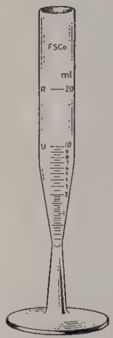


6-545
See also Nos.
6-550 and 6-555



6-560



6-565

6-535. URINOMETER, Set, F. S. Co. Precision, for accurately determining the Specific Gravity of urine. This apparatus consists of a 50 ml. cylinder, 150x28 mm., graduated in 5 ml., and numbered at every 10 ml. mark; three precision hydrometers, 100 mm. long, covering the ranges of 1.000 to 1.020, 1.020 to 1.040 and 1.040 to 1.060 in .001 divisions; and a thermometer, 100 mm. long, calibrated directly in terms of Specific Gravity, for correcting the observed readings for temperature variations from the standard of 25° C. (77°F). With this apparatus, the entire range of Specific Gravities occurring in Clinical Diagnosis is covered. The graduated cylinder permits of the determination of the gravity of a sample of urine and measuring a definite volume for use in subsequent analysis. This saves time and the sample, which is important where limited quantities are available for analysis. **Each, $6.00**

6-540. URINOMETER, Pittsburgh, designed on the principle of the regular storage battery hydrometer, for the rapid determination of Specific Gravity of urine. With this urinometer, determinations can be made with as little as 10 ml. of liquid. The urine is drawn up into the float chamber by operating the bulb, and when the hydrometer floats the reading can be made directly. The hydrometer is 4 inches long, graduated 1.000 to 1.060 in 0.001 degrees. The urinometer is about 14 inches long over all, and is made with a glass suction tube long enough to reach the bottom of the usual 4 ounce sample bottle. **Each, $2.25**

6-545. URINOMETER, Set, Vogel, for determining the Specific Gravity of Urine. The hydrometer is about 5 inches long, graduated 1.000 to 1.060 in .001 and furnished with cylinder, 6x1⅛ inches, graduated to 2 ounces in ⅛ ounce divisions, so as to permit measuring urine for other tests directly in the cylinder used for Specific Gravity determination. If a thermometer is desired, see No. 6-550 and No. 6-555.

Supplied with graduated glass cylinder, hydrometer and directions for use, without thermometer. **Each, $1.40**

6-550. THERMOMETER, for correcting Specific Gravity, calibrated directly in terms of Specific Gravity, for correcting the observed readings when the temperature varies from the standard temperature of 25° C. (77° F). This thermometer is made especially for Specific Gravity determinations of urine; length over all, 100 mm.; supplied in hard rubber case. **Each, $1.50**

6-555. THERMOMETER, Double Graduated, 100° C and 212° F.; length over all about 300 mm. Used for measuring the temperature in order to correct the Specific Gravity determinations of urine. **Each, $1.50**

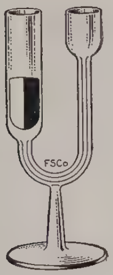
6-560. ACIDIMETER, Harrower, for determining the total acidity of urine by direct titration with N/10 Sodium Hydroxide in the presence of Phenolphthalein. The glass tube is graduated to 10 ml. in 5 ml. divisions, and above this, to 100 degrees of urine acidity in 2 degree divisions. One (1) degree of urine acidity represents 1 ml. of Tenth Normal Sodium Hydroxide required to neutralize the acidity of 100 ml. of the urine, using a phenolphthalein indicator.

Mounted on glass foot, supplied with directions for use. **Each, $1.00**

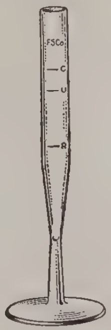
6-565. ALBUMINOMETER, Esbach, for the quantitative determination of the albumin in urine according to the picric acid method of Esbach or the phosphotungstic acid method of Pfeiffer, Tschyia modification. See *Simon, "Clinical Diagnosis," 617 (1922).*

This Albuminometer consists of a graduated tube, calibrated for the quantities of urine (U) and reagent (R) to be added. The amount of albumin present in the urine in parts per thousand (grams of albumin per liter of urine) can be read directly. The range of the instrument is up to 12 parts per thousand, and is, therefore, suitable for practically all urine analysis.

Mounted on glass foot, supplied with directions for use. **Each, $1.00**



6-570



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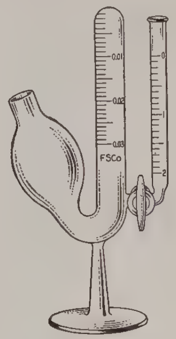


6-580

6-570. ALBUMINOMETER, Horismascope, for the qualitative determination of albumen in urine according to Heller's Nitric Acid Method. See *Haden, "Clinical Laboratory Methods," 19 (1923).*

The horismascope consists of a U-tube, one arm of which is enlarged. This arm has a painted shield, one-half black and the other half white for showing distinctly the albumen precipitate. The other arm is enlarged at the top, and serves as a funnel for introducing the nitric acid beneath the layer of urine and insuring a very definite line of contact. This permits full strength nitric acid coming into direct contact with the urine. As small as 0.02 per cent of albumen can be detected in this manner.

Mounted on glass foot, supplied with directions for use. **Each, $1.25**

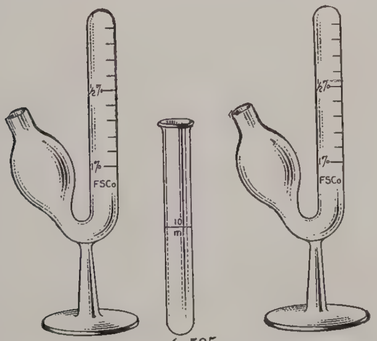
6-575. INDICANOMETER, for the determination of Indican in Urine (Intestinal Infection) by the Obermayer and Jaffe Methods. See *Simon, "Clinical Diagnosis," 651 (1922).*

Tube is graduated for the quantities of reagent (R), urine (U), and chloroform (C). The tube is mounted on a glass foot. **Each, $1.10**

6-580. UREOMETER, Doremus-Hinds, with glass stopcock; for the determination of urea in urine. See *Morris, "Clinical Laboratory Methods," 8 (1916).*

The central chamber is accurately graduated to read 0.03 gram, in 0.001 gram divisions, of urea to 1 ml. of urine. The small urine side-arm is graduated to 2 ml., in 1/10 ml. divisions and is connected to the central evolution chamber through a glass stopcock.

Mounted on a glass foot, supplied with directions for using. **Each, $2.50**



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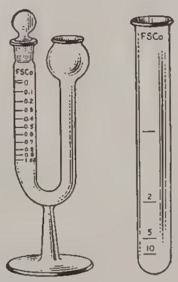


6-590

6-585. SACCHARIMETER SET, Einhorn's Fermentation, for the estimation of sugar in urine by the Fermentation Method. See *Simon, "Clinical Diagnosis," 633-640 (1922).*

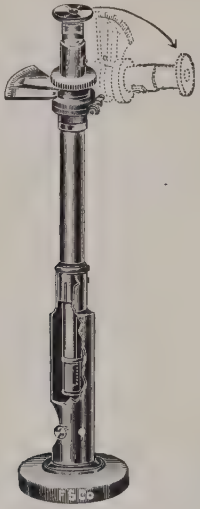
There are two saccharimeters, graduated to contain 5 ml. and calibrated for a direct reading of the sugar over a range of 1.0 per cent in 0.1 per cent. Both saccharimeters and tube are thoroughly annealed to avoid breakage, due to strains when placed in the hot water bath or sterilizer. A test tube, graduated at 10 ml., is also provided for measuring the urine.

Apparatus with two Einhorn's Fermentation Saccharimeters and measuring tube. **Per set, $2.00**

6-590. SACCHARIMETER SET, Lohnstein, for the determination of sugar in urine by the yeast method. See *Simon, "Clinical Diagnosis," 641 (1922).*

The long narrow tube is calibrated to indicate the sugar content of the urine up to 1 per cent, and is graduated in .05 per cent divisions. A vent hole in the ground glass stopper and a corresponding hole in the neck of the tube serve to release the air when the tube is being filled through the bulb on the other tube. The test tube is graduated with the necessary marks to indicate the degree of dilution of the urine.

Saccharimeter mounted on glass foot, with graduated test tube, and directions for using. **Per set, $2.50**



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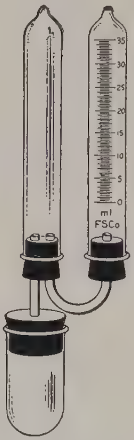


6-600

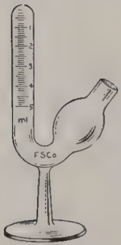
6-595. SACCHARIMETER, for Urine, Ultzmann, Polarizing. For the determination of sugar in urine, and for general laboratory and clinical analysis. See *Simon, "Clinical Diagnosis," 643 (1922)*. In general appearance this saccharimeter resembles a microscope, and operates on the principle of a polarimeter. It consists of a small object glass, dispersing lens, analyzing prism, with attached vernier moving over a calibrated scale. The glass tube is of such a length that each degree on the scale represents one per cent of grape sugar content in the liquid under examination. As it is easy to read the scale to 0.1 division, sugar content can be readily determined with an accuracy of 0.1 per cent.

With this saccharimeter, determinations can be made directly with light colored urines, while with the darker colored urines it at times becomes necessary to clarify them by means of a sugar of lead precipitation. In both these instances, the polarizing saccharimeter is much more rapid and accurate than the fermentation, or other types of apparatus for determining sugar in urine. The operation is simple, quick, precise, and gives results directly in percentage of sugar. Ultzmann Urine Saccharimeter, complete with urine observation tube, and support, in wooden carrying case. **Each, $95.00**

6-596. OBSERVATION TUBE, for urine, for Ultzmann Saccharimeter.......................... **Each, $7.50**

6-600. FERMENTATION APPARATUS, Schmidt, Pyrex; for the determination of intestinal fermentation. See *Simon, "Clinical Diagnosis," 369 (1922)*. The apparatus consists of a fermentation chamber, a glass collecting chamber and a measuring tube, graduated zero to 35 ml. in 1/5 ml. divisions. The gas evolves in the fermentation chamber and passes into the gas collecting chamber, which is filled with water. As the gas collects, the water is forced into the graduated tube and the displacement measured. The graduated tube has a vent hole in the top. The apparatus is made of Pyrex glass, so that all parts can be sterilized.

Supplied with rubber stoppers and glass connecting tubes. **Each, $4.25**



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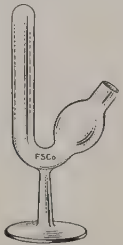

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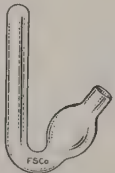
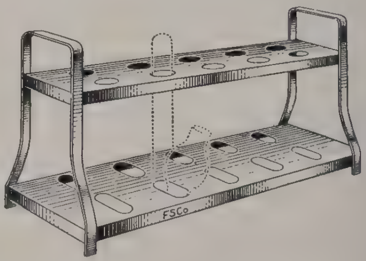


6-615



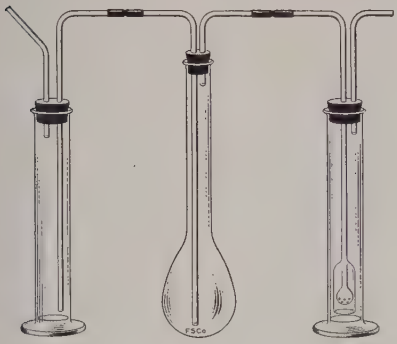
6-620

6-605. FERMENTATION TUBE, Graduated, for determining bacteria infections in the analysis of urine or feces by the fermentation method. The upright tube is 100 mm. high, about 13 mm. outside diameter, and is graduated zero to 5 ml. in 1/10 ml. divisions. The bulb is made large enough to contain more than the upright evolution chamber, in case its contents were entirely displaced during fermentation. The tube is mounted on a glass foot. **Each, $1.00**

6-610. FERMENTATION TUBE, Ungraduated, otherwise similar to No. 6-605................. **Each, $ .35**
Per dozen, 10% discount

6-615. FERMENTATION TUBE, without foot, otherwise similar to No. 6-610.................. **Each, $ .20**
Per dozen, 10% discount.

6-620. FERMENTATION TUBE RACK, with handles, made of polished copper, for supporting ten (10) No. 6-615 Fermentation Tubes. **Each, $2.75**



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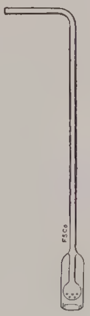
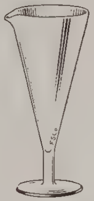
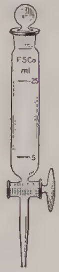


6-640



6-645



6-650

6-625. AMMONIA ABSORPTION APPARATUS, Folin-Denis, for the determination of total nitrogen in urine by the Folin-Denis direct Nesslerization Method modified Kjeldahl. See *Simon, "Clinical Diagnosis," 577 (1922).*

The apparatus consists of two glass cylinders, 10 inches high and 1½ inches diameter, one for alkali and one for absorption; one 300 ml. Pyrex Kjeldahl digestion flask; and one ammonia absorption bell. The small holes in the special absorption bell at the end of the dip tube, divides the vapor stream into many small bubbles, exposing a maximum surface of vapor to the absorbing liquid. As the bubbles rise, they set up a circulation in the absorbing solution, which is drawn in at the mouth of the bell and is forced out through the holes at the top. This method insures fresh solution being continually brought into contact with the absorbing solution.

Apparatus as illustrated, complete with rubber stoppers and glass connecting tubes for attachment to a suction line. **Each, $3.75**

6-630. CYLINDER, for No. 6-625 Folin-Denis Ammonia Absorption Apparatus, 10 inches high and 1½ inches diameter. **Each, $ .50**

6-635. DIGESTION FLASK, Pyrex, for No. 6-625 Folin-Denis Ammonia Absorption Apparatus, capacity 300 ml. **Each, $ .28**

6-640. AMMONIA ABSORPTION BELL, for No. 6-625 Folin-Denis Ammonia Absorption Apparatus, length over all about 12 inches. **Each, $1.25**

6-645. SEDIMENT GLASSES, Conical, for making general qualitative tests, such as albumin and sugar in urine. See *Simon, "Clinical Diagnosis," 612 (1922).* These glasses are also useful for concentrating the sediment and decanting the supernatant liquid in tests involving precipitations. Supplied with pour-out, mounted on glass foot.

Capacity, ml	60	125	200
Each	$ .55	.65	.75

Per dozen, 10% discount.

6-650. LACTIC ACID FUNNEL, Strauss, for the determination of lactic acid in gastric juice, by the Ferric Chloride Method. See *Hawk, "Practical Physiological Chemistry," 172 (1923).* This apparatus is recommended only for the determination of relatively large amounts (0.5 to 1 part per 1000) of lactic acid as occur in gastric juice. This funnel should not be used for diagnosis of lactic acid in the mouth due to fermentation or to the feeding of special test breakfasts of the Eward type.

The Strauss Lactic Acid Funnel is made of glass, graduated at 5 ml. and 25 ml., and fitted with a glass stopcock and a ground-in glass stopper. For Ferric Chloride Dropping Bottle, see No. 2-980.

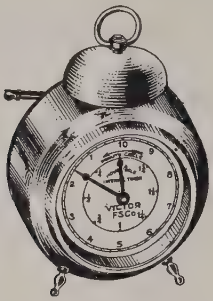
Supplied, without dropping bottle. **Each, $2.25**

HUMAN MILK TESTERS, see No. 12-770 to No. 12-780.

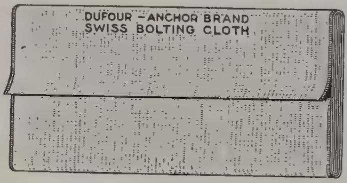
BIBLIOGRAPHY

These and many other books on the subject of Clinical Diagnosis can be supplied on short notice and shipped along with laboratory supplies

FINDLAY	**Practical Physical Chemistry**
FOLIN	**Laboratory Manual of Biological Chemistry**
HADEN	**Clinical Laboratory Methods**
HAWK	**Practical Physical Chemistry**
MORRIS	**Clinical Laboratory Methods**
MYERS	**Chemical Analysis of Blood**
PURDY	**Practical Urinalysis and Diagnosis**
SIMON	**Clinical Diagnosis**



6-660



2-755

6-660. **CLOCK, Victor Interval Timer.** This is a convenient and accurate reminder in laboratory operations, where a definite period of time is an important factor. The clock can be set for any interval from ¼ minute to 2 hours. It is constructed so that the works operate when the alarm is set, and stop as soon as the bell rings. Therefore, this clock can be used only as an interval timer and not as a time-piece.

The outer circle on the dial represents a 10-minute period, with ¼-minute divisions. The inner circle represents a 2-hour period, with ¼-hour divisions. A knurled set-screw, in the rear, is used to set the hands for the interval desired and a lever is raised to set the alarm and start the clock. The hands move clockwise and, at the end of the interval indicated, the lever drops. This stops the clock and rings the bell. To repeat, the lever is raised again.

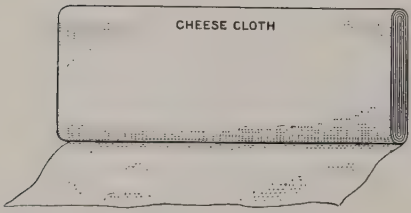
The dial is white, with black figures. The clock case is nickel-plated, 3¾ inches diameter. Full directions are supplied with each instrument. **Each, $5.00**

CLOCK, Gas Regulator, See No. 11-255, page 397.

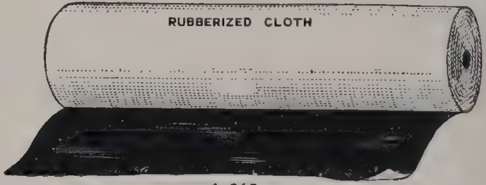
2-755. **CLOTH, Bolting, Dufour—Anchor Brand.** This is the genuine Swiss bolting cloth used for making sieves. It is manufactured of pure silk of "Standard" weight and is 40 inches wide (any length may be purchased but the width must be 40 inches).

Number	7	8	9	10	11	12	13	14
Meshes per linear inch	82	86	97	109	116	125	129	139
Per linear yard, 40 in. wide	**$5.30**	**5.85**	**6.30**	**6.90**	**7.25**	**7.80**	**8.10**	**8.55**

Number	15	16	17	18	19	20	21	25
Meshes per linear inch	150	157	163	166	169	173	178	200
Per linear yard, 40 in. wide	**$9.05**	**10.05**	**11.25**	**13.50**	**15.20**	**16.80**	**18.00**	**21.00**



6-665



1-362

6-665. **CLOTH, Cheese.** This cheesecloth is very absorbent and manufactured without starch. The single weight makes a suitable duster for instruments on account of its soft texture and absorbent quality. The double weight is used as a filtering medium for waxes and as a press cloth for crystals in oil analysis or for heavier dust cloths.

Weight	Single	Double
Width, inches	36	36
Per yard	**$ .15**	**.20**

Roll of 100 yards, 20% discount.

CLOTH, Emery. See Emery Cloth, page 324.

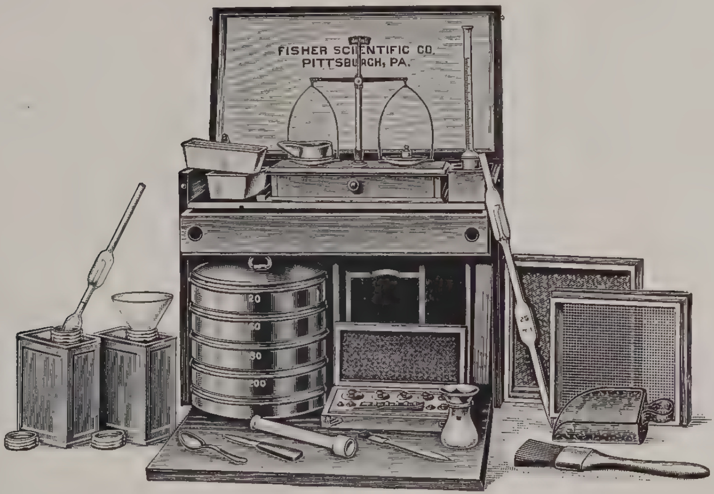
1-362. **CLOTH, Rubberized; of extra quality,** made by covering a closely woven white cloth with a coating of fine black rubber. This makes the whole strong, soft and pliable, with a durability far above the average rubberized cloth. The rubber coating is water and acid proof.

This cloth can be sewed together and made into aprons, oversleeves, balance covers and microscope covers. It is also used, as it comes from the roll, for dust protecting cloths, to cover apparatus set up for future use. Made in rolls 45 inches wide and sold by the linear yard in any length desired. **Per linear yard, $1.15**

CLOTH, Wire. See Wire Gauze.

CLOTHES PROTECTORS. See Aprons, Coats, and Sleeves, pages 16 and 17.

COAL AND COAL BY-PRODUCTS TESTING APPARATUS



6-670

6-670. COAL AND ROCK DUST ANALYZER, Fisher, for the convenient and rapid determination of the incombustible matter in coal and rock dust mixtures used for dusting mines as a precaution against mine fires. Designed by our own chemists and engineers in coöperation with the U. S. Bureau of Mines at Pittsburgh, Pa., and some of the foremost authorities on rock dusting in the Pittsburgh coal district.

Method of Analysis. The method of analysis consists essentially of the determination of the Specific Gravity of the dust by means of the displacement method and is equally applicable to the road, rib and roof dusts of a mine. The dust is collected in the mine and sieved to pass a 10-mesh screen. A sample is then sent to the laboratory for the determination of combustible matter. This is done by weighing out 20 grams of the dust, transferring it to the volumeter, adding 25 ml. of the alcohol and shaking until the dust has become thoroughly wetted. Another 25 ml. of alcohol is then added and the percentage of incombustible matter determined by reading the volumeter scale at the level of the liquid. For additional details of the method, see *Bureau of Mines Technical Paper, No. 144,* "The Determination of Incombustible Matter in Coal and Rock Dust Mixtures (1924)." The analyzer consists of two parts: The dust collecting apparatus and the testing apparatus proper, both packed in one convenient carrying case.

The Sample Collecting Apparatus consists of a galvanized iron scoop, a 3-inch hairbrush, and a 10 mesh galvanized iron screen with receiver. The screen is 8 inches square, has wooden sides and will telescope into the receiver so as to take up very little space during transportation to and from the mine. The scoop may be carried between the sieve and receiver, while the brush may be conveniently tucked away in the pocket of the sample collector. The entire sampling apparatus occupies only 8x8x2 inches.

The Testing Apparatus consists of a balance and set of weights, for weighing the sample of dust; an aluminum weighing pan and a 20 gm. counterpoise weight; a balance brush; two tared aluminum weighing pans for weighing the rock dust; a steel spatula; an aluminum spoon; a set of sieves consisting of one each of 20, 60, 80 and 200-mesh brass frame sieves with a cover and receiver, used for determining the fineness of the rock and coal dust; two quart cans, one for holding unused alcohol and one for receiving the used alcohol, which may be filtered and reused after distillation; a package of filter paper; a three-inch glass funnel; one brass wide mouth funnel, used in transferring the dust to the volumeter; two precision volumeters, and two special 25 ml. trapped safety pipettes.

The Two Volumeters are the Bureau of Mines modification of the Taffanel Volumeter and are graduated to read directly in per cent of incombustible matter. The purpose for which they are used requires that they be made with great care and precision, and we make them to designs and specifications and each one passes a test.

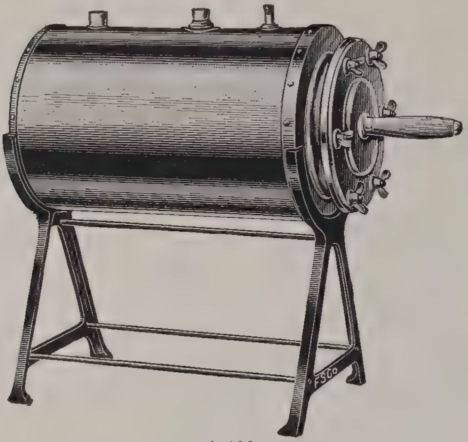
The Two Safety Pipettes. These pipettes are designed to overcome any possibility of having the denatured alcohol, used in this test, drawn into the mouth. The pipettes are similar to the regular volmetric pipettes with the upper end drawn down to a small bore and bent to one side. Around this end is fused a bulb with a tube at its upper end. This bulb and the small bore tube thus form a liquid trap. The small tube serves as a nozzle, deflecting the stream of alcohol against the side of the trap, while only air is withdrawn from the trap through the large tube into the operator's mouth. Capacity of each pipette, 25 ml.

The Case is 10 inches deep, 15 inches high and 19 inches wide, has a hinged cover with attached carrying handle and front door which may be lowered and used as a work bench. The case is divided into three compartments which were designed to take this particular equipment and hold it securely when the case is carried. The entire Apparatus is designed to be compact, convenient and serviceable.

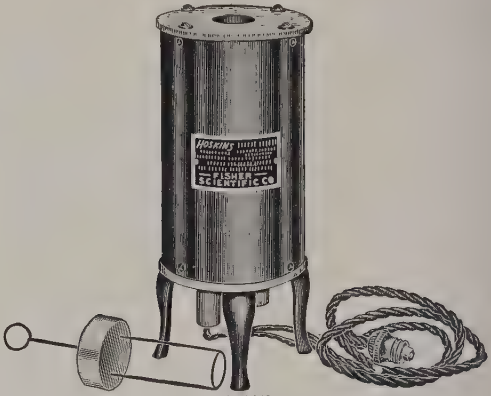
Fisher Coal and Rock Dust Analyzer No. 6-670 with sampling and testing apparatus, in case as described. **Each, $95.00**

For extra parts for No. 6-670, see page 218.

Coal Testing Apparatus



6-690



6-695

6-675. VOLUMETER only, for replacing the volumeters supplied with No. 6-670 Fisher Coal Dust Analyzer; as described under that number. **Each, $3.00**

6-680. SAFETY PIPETTE only, for replacing the pipettes supplied with No. 6-670 Fisher Coal Dust Analyzer; as described under that number. **Each, $2.50**

6-685. FILTER PAPER, for Fisher Coal Dust Analyzer, No. 6-670, Extra Filter Paper, 100 sheets to the package. **Per package, $ .45**

6-690. COAL MOISTURE OVEN, Double Walled, Vacuum, Constant Temperature, for determining the moisture content of coal according to the method described in the A. S. T. M. *Standard Methods for 1924,* Serial Designation D 22-24, and the *Gas Chemists' Handbook, XIII,* 1922. The oven consists essentially of a cylindrical drying chamber surrounded by an annular water jacket. The ends of the oven are cast brass, the front being a flanged door sealed by means of six wing nuts and a rubber gasket. The entire oven is supported by a heavy cast iron stand. Drying chamber is 16 inches long by 6 inches in diameter. Oven is 18 inches long by 11 inches wide by 20 inches high.

Operation of the Oven. The jacket is filled with a glycerine-water solution (Sp. Gr. 1.19 at 15° C. and B. Pt. 105° C.) and heated by means of two Fisher Burners No. 3-900; after the temperature reaches the boiling point of the glycerine solution, one burner is sufficient. A Soxhlet Condenser is then attached to the upper vent of the jacket to reflux the boiling solution and so keep it at a constant composition. The exact temperature of the oven may be ascertained by means of a thermometer inserted through a second vent on top of the oven, and extending directly into the drying chamber. The third vent on top of the oven, extends downward into the drying chamber and serves as a vapor outlet to be directly connected to a vacuum line. At the rear of the oven are two hose connections for the drying gas, air, hydrogen or carbon dioxide. Air thoroughly dried by passage through concentrated sulphuric acid is usually used. It is forced through the lower connection, becomes saturated with the water vapor evolved by the samples, and is passed out of the oven through the upper connection.

The oven is made of heavy copper and brass with all joints soldered. It can therefore be used for all work where relatively low temperatures and pressures are encountered, i. e., below 200° C. and 20 inches of vacuum or pressure. Supplied without thermometer, condenser or burner. **Each, $70.00**

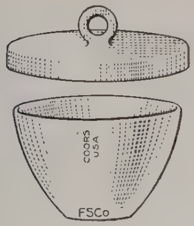
THERMOMETER, for No. 6-690 Coal Moisture Oven. See Thermometers, etched stem, 110° C.
BURNERS, for No. 6-690 Coal Moisture Oven. See Fisher Burner, No. 3-900.
CONDENSER, for No. 6-690 Coal Moisture Oven. See Condenser, Soxhlet, page 258.

6-695. FURNACE, Fieldner, Electric. For determining the Volatile Content of Coal according to the A. S. T. M. *Standard Methods for 1924,* Serial Designation D 22-24, "Analysis of Coal"; designed by Mr. A. C. Fieldner, Director of the Pittsburgh Station, U. S. Bureau of Mines. The method is more fully explained in *Bureau of Mines Bulletin No. 85.*

The furnace consists of a heating chamber 6 inches high by 1½ inches in diameter, surrounded by a thick layer of heat insulating material, bound together by a metal sleeve and Transite end-pieces. The heating element is a coiled replaceable nickel-chromium unit which extends about 4 inches up the inside of the heating chamber. The cover of the furnace has a chromel wire support for holding the crucible within the furnace. This insures the coal being always in the same position, and gives reproducible results. It also permits the crucible to be quickly inserted and withdrawn from the hot zone. This is very important as the method of analysis specifies a definite time of heating, and a delayed withdrawal would change results. A thermo-couple pyrometer may be used to note the temperature. (*See Pyrometers.*) Temperature control of the furnace is obtained by means of a rheostat in series with the furnace. This furnace is supplied for operation on either 110 or 220 volt alternating or direct current and draws about 360 watts. It is equipped with cover and cord and is supplied without rheostat. Specify voltage when ordering. **Furnace, without rheostat, $40.00**

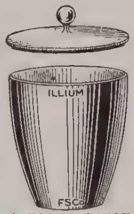
6-700. RHEOSTAT, for controlling temperature of No. 6-695 Fieldner Furnace. Specify voltage when ordering. **Each, $10.00**

6-705. HEATING ELEMENT, for replacing the unit in the No. 6-695 Fieldner Furnace. This consists of a refractory wound with the resistance wire; complete, ready for immediate replacement into the furnace. Specify voltage when ordering. **Each, $8.50**



6-710 6-715

6-720 6-725



6-730 6-735

6-710. CRUCIBLE, Porcelain, for the determination of **Moisture** and **Volatile Matter in Coal,** according to A. S. T. M. *Standard Methods for 1924,* Serial Designation D 22-24, "Analysis of Coal." This crucible is 25 mm. high, 41 mm. diameter and is glazed inside and outside except the bottom surface. **Each, $ .22**

6-715. CRUCIBLE COVER, Porcelain, for No. 6-710 Crucible...... .... **Each, $ .08**

6-720. CRUCIBLE, Illium, for determining the **Moisture** and **Volatile Matter in Coal,** according to the A. S. T. M. *Standard Methods for 1924,* Serial Designation D 22-24, "Analysis of Coal." Crucible has capacity of 20 ml. and can be fitted with No. 6-725 Insert Cover which sets down into the crucible making a close fit. This crucible has been found to be constant in weight even after 200 determinations, and in some cases, was still in good condition after platinum crucibles had become bottom-cracked. More information regarding the properties of illium metal is given under No. 4-350. Supplied without cover. **Each, $15.50**

6-725. ILLIUM INSERT COVER, for use with No. 6-720 Illium, 20 ml. Crucible. This cover fits inside the top of the crucible and permits volatile matter to escape, but prevents the solid matter from escaping. **Each, $5.50**

6-730. CRUCIBLE, Illium. Similar to No. 6-720, except the capacity is 10 ml. This crucible is recommended for the ignition of Barium Sulphate in the determination of the **Sulphur Content of Coal** by the Eschka Method. According to the A. S. T. M. *Standard Methods for 1924,* Serial Designation D 22-24, "Analysis of Coal." **Crucible, without cover, $13.00**

6-735. ILLIUM FLAT COVER. For use with No. 6-730 Illium, 10 ml. Crucible. This flat cover is recessed and fits over the top of the crucible. It is heavy enough to fit tight, except when a slight pressure is generated inside the crucible. There is a knob on the top for handling it. **Each, $3.00**

See No. 6-736 to No. 6-739 incl.

For determining the fineness of coal and coke according to the A. S. T. M. *Standard Methods for 1924.* These sieves are all 8 inches in diameter, are made to conform to the specifications of the U. S. Government for the U. S. Standard Sieve Series and are recommended for the various determinations of fineness of all coals and cokes.

For more complete data concerning U. S. Standard Sieve Series, see specifications just preceding No. 4-880.

6-736. SIEVE SET, Ash, F. S. Co., U. S. Standard Sieve Series. Consisting of three brass frame sieves, 8 inches diameter, with one cover and one receiver. **Sieves Nos. 20, 60 and 200;** recommended for use in A. S. T. M. "*Standard Method of Laboratory Sampling and Analysis of Coal,*" Serial Designation D 22-24. **Per set, $21.25**

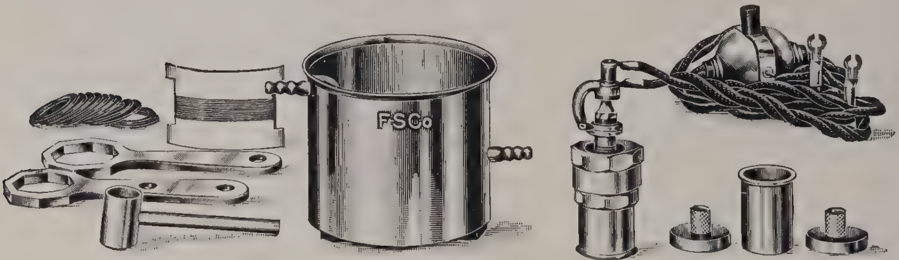
6-737. SIEVE SET, Coke, F. S. Co., U. S. Standard Sieve Series. Consisting of three brass frame sieves, 8 inches diameter, with one cover and receiver. **Sieves Nos. 4, 10 and 60;** recommended for use in A.S.T.M. "*Standard Method of Laboratory Sampling and Analysis of Coke,*" Serial Designation D 37-24. **Per set, $16.75**

6-738. SIEVE, for Specific Gravity Test. One F. S. Co., U. S. Standard Sieve Series No. 200 Brass Frame Sieve, 8 inches diameter, with cover and receiver. Recommended for use in A. S. T. M. "*Standard Method of Test of Volume of Cell Space of Lump Coal,*" Serial Designation D 167-24. **Each, $12.50**

6-739. SIEVE SET, Powdered Coal, F. S. Co., U. S. Standard Sieve Series. Consisting of six brass frame sieves 8 inches diameter, with one cover and one receiver. **Sieves Nos. 40, 50, 70, 100, 140 and 200;** recommended for use in A. S. T. M. "*Method of Test of Fineness of Powdered Coal,*" Serial Designation D 197-24T. **Per set, $38.00**

SIEVE SHAKING MACHINE. See No. 4-905.

PARR COAL SULPHUR BOMB



6-740

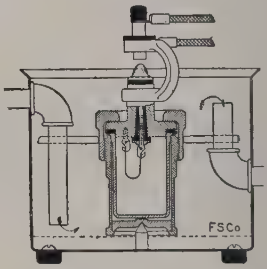
SULPHUR-IN-COAL METHODS

Of the various methods of determining the Sulphur Content of Coal, three methods merit particular attention.

1st. The long and tedious, but accurate, chemical method of oxidizing the sulphur to sulphuric acid and determining it as barium sulphate gravimetrically, or photometrically in a Sulphur Photometer *(see No. 4-480)*.

2nd. The method of determining it along with the determination of calorific value, as described under Calorimeter No. 4-430.

3rd. The Sulphur Bomb Method, which parallels the second method above, but which is much more rapid, due to the fact that no temperary readings are necessary and the apparatus is much more simplified. In this method the sulphur is oxidized to sulphuric acid in the presence of sodium peroxide and an accelerator, and the sulphur thus produced, converted to barium sulphate and determined photometrically in a Parr Sulphur Photometer, No. 4-480.



Cross-section of No. 6-740

6-740. COAL SULPHUR BOMB, Parr Improved, Electric. For carrying out the third method noted above. This apparatus (*see Jour. of Ind. and Eng. Chem., Mar., 1919*) consists of a special alkali resisting bomb with a removable lining and electric ignition system. Its construction and operation is similar to that of the Peroxide Bomb of Calorimeter No. 4-430. The sample of coal mixed with peroxide and accelerator is placed in the bomb, and the bomb placed in the jacket, then a current of about 4 amperes passed through the fuse wire. By closing the switch provided on the cord, the current is passed through the bomb. This current may be obtained from dry batteries or from the ordinary 110 volt lighting current of the laboratory by stepping it down with Rheostat No. 4-380.

The conversion of sulphur to sulphate by this method takes but a few minutes compared to the chemical oxidation method, which consumes half an hour or more. After the reaction has quieted down, water is passed through the water bath for several minutes, the ignition cord disconnected and the bomb removed. Upon opening it, the lining may then be placed in a beaker and the contents dissolved preparatory to the precipitation of the sulphate. While the contents are dissolving, another lining may be substituted and the bomb put back into use immediately. This saves time where many samples are to be analyzed in succession. The sulphur content is determined in Photometer No. 4-480.

The No. 6-740 **Parr Sulphur Bomb Outfit,** including one complete assembled bomb with electrical ignition top; water jacket; two plain caps for bomb; one extra bomb lining; cord and switch; peroxide measuring dipper; card of fuse wire; one dozen extra bomb gaskets, and direction booklet. **Each, $35.00**

6-745. SULPHUR BOMB LINING. Made of alkali-resisting metal, for use in Parr Sulphur Bomb No. 6-740. **Each, $5.75**

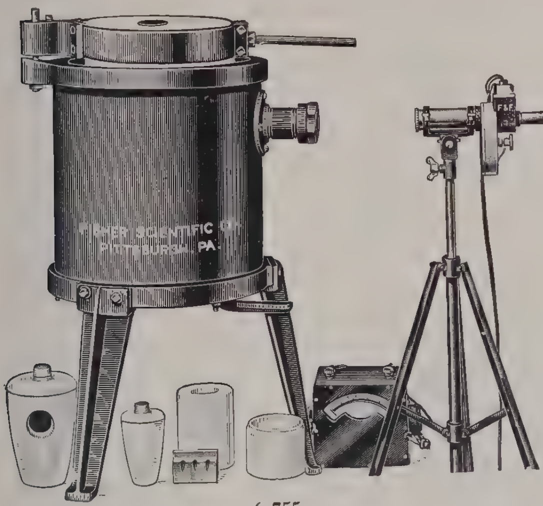
6-750. SULPHUR BOMB GASKETS, Asbestos, for use in No. 6-745 Parr Sulphur Bomb..... **Per dozen, $ .35**

CHEMICALS, for use in No. 6-740 Sulphur Bomb. See Sodium Peroxide No. 4-450 and Accelerator No. 4-455. **IGNITION WIRE, for use in No. 6-740 Sulphur Bomb.** See No. 4-395.

COAL CALORIMETERS. See Calorimeters, No. 4-350 to No. 4-575, inclusive.

COAL TAR APPARATUS, for testing Coal Tar Pitches, Asphalts and Allied Substances. See Asphalt Testing Apparatus, No. 1-475 to No. 1-795, inclusive.

NITROGEN APPARATUS, for Determining the Nitrogen Content of Coal. See Kjeldahl Apparatus listed under Nitrogen Determination Apparatus.


FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

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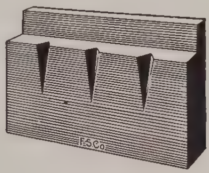


6-765

6-755. **COAL ASH MELTING POINT OUTFIT. For Determining the Fusibility of Coal Ash** according to the A. S. T. M. *Standard Methods for 1924*. Serial Designation D 22-24, "Analysis of Coal."

Method of Test. The ash is finely ground in a Fisher Mortar Grinder (see Crushers and Grinders), mixed with a binder and formed into cones by means of the mold.

The ash cones are then placed in the furnace on refractory supports provided, the cones observed through the peep hole in the furnace, and the temperature and point at which they fuse is observed simultaneously with a Fisher and Foote Optical Pyrometer.

The furnace is of the pot type designed so that the burner enters the fire box at a tangent, near the base, producing a rotary flame which completely surrounds the crucible in which the cones of coal ash are placed. The furnace proper consists of replaceable high-temperature (melting point 3300–3400° F.) fire-clay parts, all surrounded with a thick layer of heat insulation. Floor space required 21x24 inches, height 31 inches. The burner permits very accurate control of gas and compressed air; a reducing or an oxidizing atmosphere can be obtained. The ash cones are supported on a plate of alundum cement which rests on the smaller crucible; this is placed within a larger crucible which rests on a fire-clay support. The outer crucible has peep holes for observing the cones during the determination.

Brass Cone Mold. This mold is made of solid brass, and will cast 3 molds each ¾ inch high and ¼ inch on a side.

Pyrometer, F. & F. (Fisher and Foote). This pyrometer is of the optical, disappearing-filament, direct-reading type, range 1600 to 4000° F. The light radiated from the melting cone is passed through a focusing lens, a wedge shaped light-absorbing screen and thence to the eyepiece. Between the eyepiece and the wedge, at the focus of the lens, is placed the filament of a standardized lamp, which burns at a constant temperature. The light emitted by the cone is absorbed by the rotating wedge until it is of the same intensity as the lamp filament. When this occurs, the filament is seen to just disappear and blend with the field of light from the cone. To maintain the lamp at a constant temperature, each lamp has been calibrated for its normal point, or point of constant illumination and constant current consumption. Each pyrometer is equipped with batteries, ammeter and a rheostat, mounted in a convenient carrying case.

This pyrometer has been used at the United States Bureau of Mines, and is approved by them and accepted by the A. S. T. M. Committee on Coal and Coke. In addition to meeting all the requirements, it has the advantage of reading the temperature directly without the use of tables.

The complete outfit consists of a gas-fired Coal Ash Melting Point Furnace, muffle crucible, supporting crucible, pedestal support, brass cone mold, F. & F. Optical Pyrometer and a tripod for holding the pyrometer. **Each, $310.00**

(For more complete description of F. & F. Pyrometer, see Pyrometers.)

6-760. **FURNACE** only, with inside supports and burner as described under No. 6-755............**Each, $110.00**

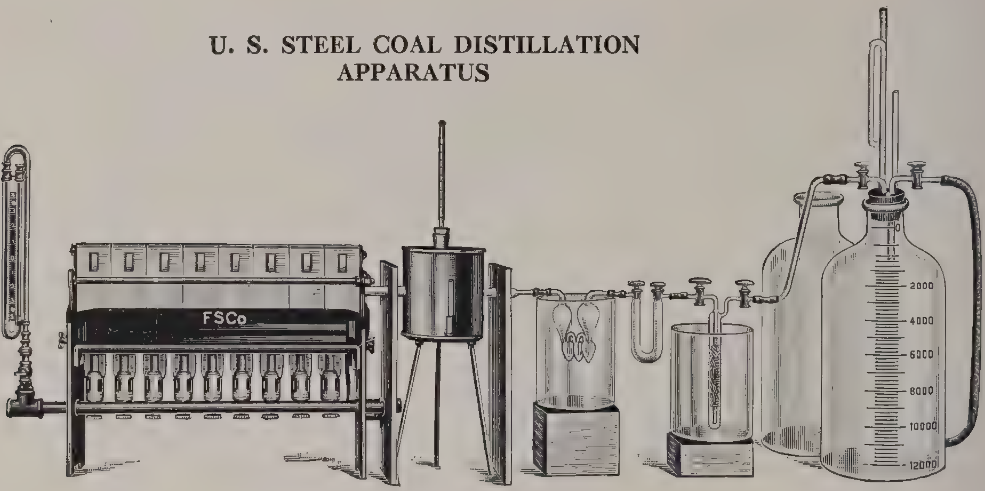
6-765. **CONE MOLD** only, made of brass for making three test cones as described under No. 6-755...**Each, $4.50**

6-770. **OPTICAL PYROMETER** only, **F. & F.** (Fisher and Foote). For observing the temperature and fusing point of coal ash cones by method described under No. 6-755; with ammeter and rheostat, without tripod. **Each, $175.00**

6-775. **TRIPOD** only, **for F. & F. Pyrometer;** with adjustments and universal joints. Used for holding pyrometer No. 6-770 in any fixed position. **Each, $20.00**

6-780. **COAL ASH BLOWING TUBE, Porcelain,** for use with the Coal Ash Melting Point Furnace No. 6-755. To facilitate observation of the outlines of the cone, this tube is inserted into the furnace and a very small amount of compressed air is momentarily directed against the cones, thus temporarily cooling them and rendering the outlines more visible so that the fusing point can be more clearly observed. The blowing tube is connected to a compressed air line by means of rubber tubing and the air let into the blowing tube at the time of observation by means of a pinchcock. This tube is made of high temperature porcelain, ¼ inch in diameter, about 12 inches long, and is bent, at the closed end, into the shape of an arc of a circle and perforated so as to direct the streams of air directly against the tips of the cones. **Each, $2.50**

U. S. STEEL COAL DISTILLATION APPARATUS



6-805

6-805. COAL DISTILLATION APPARATUS, U. S. Steel Corporation Type. Made by us especially for the determination of the yields of coke, gas, and by-products obtainable in the progressive dry distillation of coal. Apparatus consists of a combustion furnace, silica distillation tube, asbestos screens, tar filtering tube, steam bath, Geissler absorption bulb, jar for Geissler bulb, calcium chloride tube, freezing tube and jar, 12 liter gasometer with manometer and leveling bottle.

Furnace. This coal distillation furnace was designed by us especially for use in this test. It has a pure nickel trough for supporting the combustion tube and uniformly distributing the heat along the tube.

A gas pressure manometer is provided on the inlet side of the gas manifold; this enables the operator to adjust the gas to a constant pressure.

The furnace is heated by 9 Fisher Burners which will operate on any kind of gas (except acetylene) and produce the high temperature necessary for the complete coking of coal, even when operated with gases of low B. T. U. values. These burners are completely described under No. 3-900.

There are two rows of fire clay tiles which act as heat reflectors and permit observation of the tube at any point.

Coal Distillation Tube, Silica. This silica tube is 500 mm. long and 18 to 20 mm. inside diameter, with one end closed. We recommend the silica tube for this purpose because the working temperature is close to the softening point of the hardest glass obtainable. The silica tube is also more resistant to the fluxing action of the ash and it can be used repeatedly. It is illustrated under No. 6-815.

Tar Filtering Tube. This is made of thoroughly annealed glass 180 mm. long, the diameter at the large end is 25 mm. and at the small end 6 mm. This tube condenses the tar out of the vapor stream. It is illustrated under No. 6-825.

Steam Bath. The tar filtering tube is placed within the steam bath which keeps it at constant temperature. The bath is made of heavy copper and is 5½ inches in diameter and fitted with a water gauge and steam vent, and is supported by a tripod.

Transite Shields are placed on both sides of the steam bath and insulate it from the furnace and the Geissler absorption bulb.

Geissler Bulb. This is a standard three-stage bulb with large expansion bulbs to prevent suck-backs and blow-outs. It is filled with sulphuric acid and used for absorbing ammonia, water and naphthalene. This Geissler bulb is illustrated under No. 6-840. A glass jar for the Geissler bulb is supplied; this holds the freezing mixture.

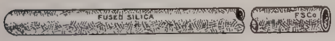
Calcium Chloride Tube. This tube, 5 inches high, is fitted with two glass stopcocks to seal it from the atmosphere while weighing. This tube is used to retain any sulphuric acid which might be carried from the Geissler bulb. It is illustrated under No. 6-845.

Freezing Tube. The separation of the lighter oils is effected by passing them through a glass-wool separator immersed in a freezing mixture. Separator consists of two concentric tubes between which the glass-wool is packed to within a distance of 2 inches from the bottom. Stopcocks on both inlet and outlet lines are provided for sealing the tube. This Freezing Tube is illustrated under No. 6-850. A glass jar for the Freezing Tube is supplied; this holds the freezing mixture.

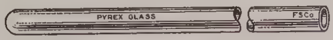
Gasometer. This is a standard 3-gallon bottle fitted with a rubber stopper and has a vapor inlet tube, a water outlet tube, and a pressure manometer. Inlet and exit tubes are fitted with stopcocks. Bottle is graduated from the top downward in 200 ml. divisions reading from 0 to 12,000 ml. and numbered at each 1000 ml. graduation mark.

Leveling Bottle. The leveling bottle has an outlet at the bottom connected to the Gasometer, and serves to receive the water or sodium chloride solution displaced by the gases generated during the coking. The bottle is raised or lowered as the water is displaced, so that the coking is carried on under standard pressure conditions. (For thermometer, see under Thermometers.)

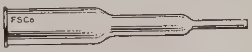
No. 6-805 complete apparatus as described. **Each, $130.00**



6-815



6-820



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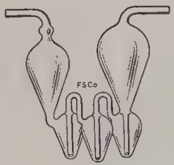

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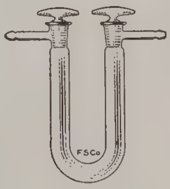


6-845

6-810. FURNACE, High Temperature Combustion, for No. 6-805 Coal Distillation Apparatus. Furnace only, with 9 Fisher Burners, nickel trough, manometer tube and clay tiles; as described under No. 6-805. **Each, $89.00**

6-815. COAL DISTILLATION TUBE, Silica, for No. 6-805 Coal Distillation Apparatus. Length 500 mm.; inside diameter 18 to 20 mm., one end closed. Tube only. **Each, $5.45**

6-820. COAL DISTILLATION TUBE, Pyrex Glass. This tube is 500 mm. long and 17 to 19 mm. inside diameter, one end closed. This tube is sometimes used instead of the silica tube. This is the hardest glass available, but it is not guaranteed for more than one determination. **Each, $ 1.45**

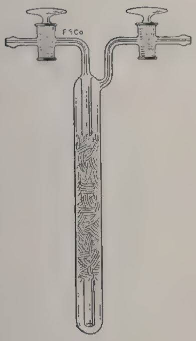
6-825. TAR FILTER TUBE, Glass, for No. 6-805 Coal Distillation Apparatus. The tube is 180 mm. long; large diameter 25 mm., small diameter 6 mm. **Each, $1.25**

6-830. STEAM BATH, for No. 6-805 Coal Distillation Apparatus, as described under that number. Copper Bath only with tripod. **Each, $8.00**

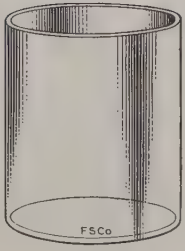
6-835. TRANSITE SHIELD, for No. 6-805 Coal Distillation Apparatus. Shields are 12x14x¼ inches with hole to accommodate combustion train. **Each, $1.50**

6-840. GEISSLER ABSORPTION BULB, for No. 6-805 Coal Distillation Apparatus. Bulb only, as described under that number. **Each, $2.00**

6-845. CALCIUM CHLORIDE TUBES, for No. 6-805 Coal Distillation Apparatus, as described under that number. **Each, $1.60**



6-850



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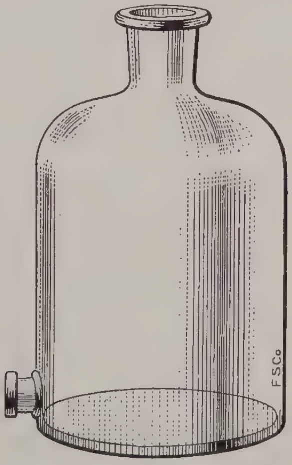


6-860

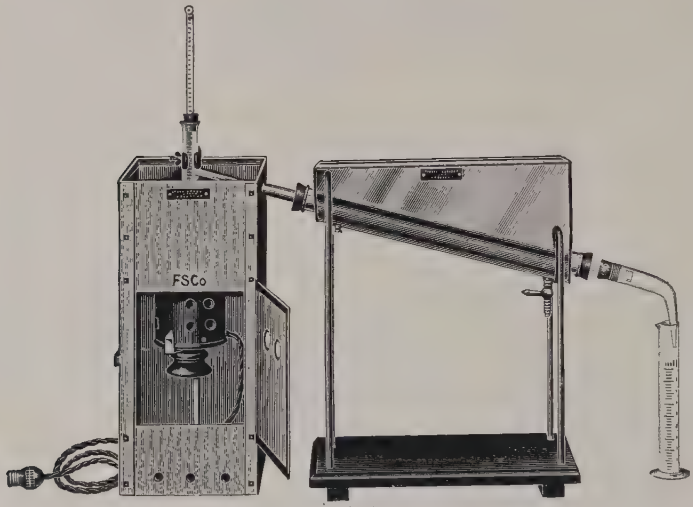
6-850. FREEZING TUBE, for No. 6-805 Coal Distillation Apparatus. This tube is about 250 mm. long; both the inlet and the outlet tubes have glass stopcocks, as described under No. 6-805. **Each, $6.50**

6-853. FREEZING JAR. This jar is 125 mm. diameter and 175 mm. high. The same size jar is used for the Geissler Bulb and the Freezing Tube. **Each, $1.25**

6-855. GASOMETER, for No. 6-805 Coal Distillation Apparatus, graduated bottle only without manometer, thermometer or any fittings. **Each, $11.00**

6-860. LEVELING BOTTLE, for Gasometer, used in the No. 6-805 Coal Distillation Apparatus. Bottle only. **Each, $8.70**

BENZOL DISTILLATION APPARATUS



6-865

6-865. BENZOL DISTILLATION APPARATUS, Fisher. For the analytical distillation of benzols and similar light oils obtained in the destructive distillation of coal, tars, etc. For method see "*Journal of Industrial and Engineering Chemistry*," *X, 1006 (1918).*

Apparatus consists of a Pyrex Standard Benzol Flask; Flask Clamp; Thermometer; Electric Heater; Support for heater and flask; Draft Shield; Condenser with glass tube; Adapter and a Receiver.

The Flask is the Standard Benzol Flask used by the American Gas Association, The Barrett Co., The Koppers Co. and the U. S. Steel Corp. Capacity, 200 ml.; outside diameter of bulb, 76 mm.; neck, 105 mm. long by 23 mm., outside diameter; vapor tube in the middle of the neck at a 75° angle, 127 mm. long. **The Flask Support** has a heavy iron base 5 x 8 inches, with a 20-inch rod; it holds the electric heater and also the flask by means of the clamp.

Benzol Condensing Trough is made of copper, similar to the A. S. T. M. Tar Dehydrating Trough No. 1-615, but its support is only 20 inches high. Trough is 15¼ inches long, the bottom of the trough is parallel to the condensing tube (75 degrees to the vertical), mounted on a heavy wooden base. The outlet is a constant level overflow tube; the inlet has a stopcock.

Condensing Tube is **Pyrex glass,** 24 inches long by ½ inch inside diameter and is mounted at an angle of 75° to the vertical. A curved adapter of glass connects the condensing tube to the receiver.

Receiver, U. S. Bureau of Standards Type. This is a 100 ml. graduated cylinder, subdivided in 1 ml. divisions and the limit of error for total or partial capacity is 0.20 ml. Every tenth graduation mark extends entirely around the cylinder. Each cylinder is calibrated and graduated according to the specifications of the United States Bureau of Standards and adopted by the M. C. A. (Manufacturing Chemists' Association).

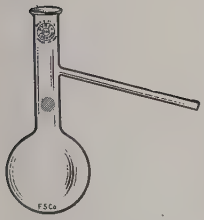
Draft Shield, for protecting the distilling flask from draughts which would affect the rate of distillation, is made of heavy, galvanized iron, lined with asbestos. It has a door in the front to permit of adjustment of the heater.

Heater. The danger of breaking distilling flasks when heated over a free flame has led more and more to the adoption of electric heaters. The heating element is coiled nichrome wire partially imbedded in a refractory cement, and is controlled by a rheostat mounted in the base. This method of mounting gives a concentrated heat, but due to the relatively small amount of wire actually imbedded, the heater responds very rapidly to any change in the quantity of electricity passed through. This eliminates the heat-lag common to the older type heaters and enables the operator to keep the rate of distillation always under his control. Another feature of this heater is its replaceable heating element. The resistance coil and its refractory may be readily removed from the heater and another heating unit substituted. However, with ordinary care this heater will give over 1000 hours of service without appreciable deterioration.

Heater is supplied complete with rheostat in black crystallized finished case, fitted with a screw clamp for attaching directly to the heater support. The opening for the flask is 1¼ inches diameter and the heater is supplied for 110 volt current unless otherwise specified.

Thermometer, F. S. Co. Standard for Refined Products. The entire apparatus has been carefully designed and protected to insure accurate results, and this thermometer is a most important part of the apparatus. The range is 60° to 140° C. graduated in ⅕ degree subdivisions, numbered every 1 degree. The accuracy is $^1/_{10}$ of one degree. Calibration is for total immersion. The length over all is about 13 inches; it is made of seasoned normal thermometer glass and is gas filled. The bulb is small, 10 to 12 mm. long and contains a small amount of mercury which makes it very sensitive. The 60 degree mark is 55 mm. above the top of the mercury bulb. The graduation marks and numbers are etched on the stem and are filled with black coloring which is insoluble in benzol vapors.

Complete Apparatus, No. 6-865, as described, **$50.00**



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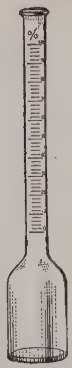

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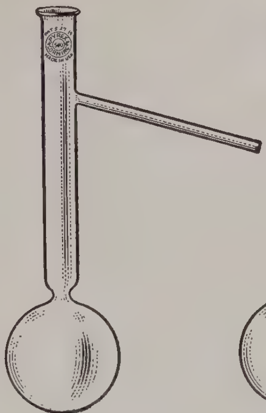

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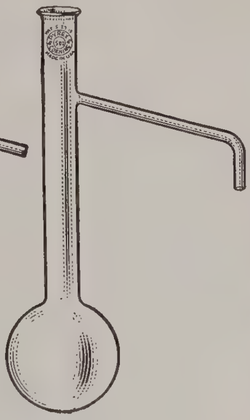

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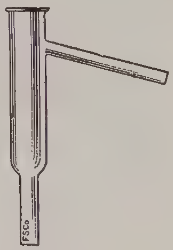


6-908 6-909

6-870. FLASK, Standard Benzol, Pyrex Glass, for use in Benzol Distillation Apparatus No. 6-865, as described under that number. Flask only. **Each, $ .55**
Case lot of 54, 10% discount.

6-875. THERMOMETER, F. S. Co. Standard for Refined Products. Range 60° to 140° C. in ⅕ degrees. For use in Benzol Distillation Apparatus No. 6-865, as described under that number. Thermometer only. **Each, $9.75**

6-880. BENZOL CONDENSER TROUGH, for Benzol Distillation Apparatus No. 6-865, as described under that number. Trough only, without tube or rubber stoppers. **Each, $12.50**

6-885. CONDENSING TUBE, Pyrex glass, for Benzol Condensing Trough, No. 6-880, as described under No. 6-865. Tube only. **Each, $ .50**

6-890. RECEIVER, U. S. Bureau of Standards Type, 100 ml.; for Benzol Distillation Apparatus No. 6-865, as described under that number. Receiver only. **Each, $2.50**

6-895. ELECTRIC HEATER, for Benzol Distillation Apparatus, No. 6-865, as described under that number. Complete with rheostat, cord, plug and support clamp.
A. For 110 volt current. **Each, $15.00**
B. For 220 volt current. **Each, $16.00**

6-900. HEATING UNIT, consisting of the resistance wire and the insulating block for replacement in Electric Heater No. 6-895.
A. For 110 volt current. **Each, $2.50**
B. For 220 volt current. **Each, $3.00**

6-902. DRAFT SHIELD, for Benzol Distillation Apparatus, No. 6-865, as described under that number. Shield only. **Each, $8.00**

TAR DEHYDRATING APPARATUS. See No. 1-585.
CREOSOTE TESTING APPARATUS. See No. 1-585 to No. 1-640, Nos. 1-695, 1-700, 1-725 and 1-730.

6-904. BABCOCK SULPHONATION BOTTLE. For determining the quantity of unsulphonated material (paraffines) in benzol and other light oils by the Babcock method. This bottle is made according to the design of the *U. S. Federal Specifications Board for Testing Petroleum, Technical Paper 323, Method 550. 1,* and is recommended for use in tests like E-8 of the Barrett Company. See *Jour. of Ind. Eng. Chem., X, 1006, Dec., 1918.* This is a modified Babcock bottle with a neck capacity of 10 ml., graduated from zero to 100% in 2% divisions. This design permits the use of about 4 times the quantity of oil permitted in the ordinary Babcock bottle, making the test just that much more accurate. It has the additional advantage of having the percentage of paraffines indicated directly on the scale, thereby eliminating all calculations. It can be used in the Babcock bottle carriers of any centrifuge. **Each, $ .85**

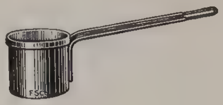
6-906. DISTILLATION FLASK, Barrett, with constriction, Pyrex Glass, capacity 500 ml.; for the fractional distillation of light oils, tars, road oils, etc. According to *Forest Service Bulletin 112,* U. S. Dept. of Agriculture, and Barrett Company Test H-13. Neck of flask is extra long and has a constriction at its lower end. This serves to support glass beads, or other packing used to increase the refluxing area, and thus effect a sharper cut or closer fractionation of the oil. **Each, $1.60**
Case lot of 12, 10% discount

6-907. DISTILLATION FLASK, Barrett, without constriction, Pyrex Glass, capacity 500 ml. Same as No. 6-906 but without the constriction in the neck. This flask is used where only slight refluxing is necessary, and it is desired to get an approximate cut rather than an exact fractionation. **Each, $1.40**
Case lot of 12, 10% discount

6-908. DISTILLING TUBE, Barrett, large size; made of Resistance Glass. To be filled with glass beads and used in the fractionation of light oils as in Test F-6 of The Barrett Company. See *Jour. of Ind. Eng. Chem., X, 1006, Dec., 1918.* Length over all 7½ inches, length of constricted portion 2 inches, diameter of constricted portion 7/16 inch, diameter at top 1 inch, length of tubulature 4 inches, diameter of tubulature 5/16 inch, angle of tubulature with the vertical 75°. **Each, $ .95**

6-909. DISTILLING TUBE, Barrett, small size. Similar to No. 6-908, but smaller. Length over all 6¼ inches, diameter at top 9/16 inch, length of constricted portion 2 inches, diameter of constricted portion 7/16 inch, length of tubulature 4 inches, diameter of tubulature 3/16 inch, angle of tubulature with the vertical 75°. **Each, $ .85**

Coal By-Products Testing Apparatus



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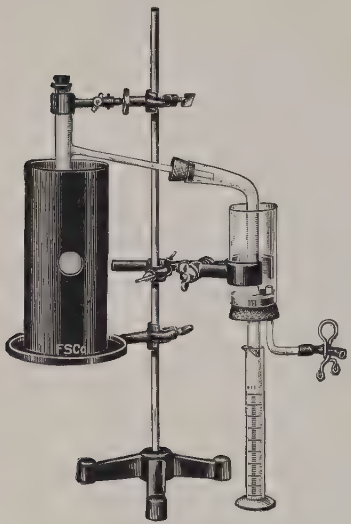
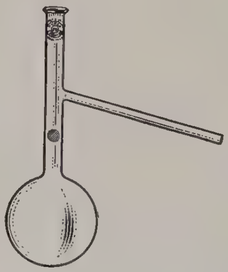


6-910



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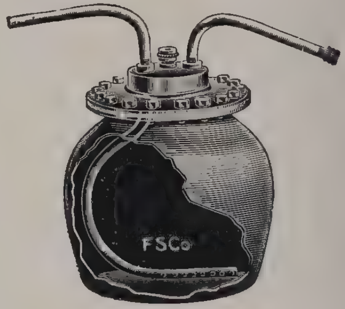


6-938

6-910. COAL TAR DISTILLATION APPARATUS, Fisher. This is our standardized apparatus for use in the analytical distillation of coal tars according to the method for the "Distillation of Road Materials" as described in A. S. T. M. *Standard Methods for 1924*, Serial Designation D 20-24 and U. S. Department of Agriculture, *Department Bulletin 1216, page 64, May, 1924*. The apparatus consists of a Pyrex A. S. T. M. Road Materials Distillation Flask with a metal shield, an adapter-type condenser and an M. C. A. 25 ml. graduated cylinder for a receiver. The apparatus is mounted on a heavy iron support.

The Flask is a standard Tar Test Flask (sometimes called Road Materials Flask), made of Pyrex glass with a capacity 250 ml.; length of neck 150 mm.; diameter of neck 17 mm.; outlet tube 77 mm. from top of neck; length of outlet tube 150 mm.; diameter of outlet tube 9 mm.; angle of outlet tube to the vertical 75°.

A heavy Iron Shield surrounds the flask and protects it from draughts. It has a hole 25 mm. in diameter in the side for observing the distillation. The shield is 200 mm. high and 90 mm. diameter.

The Condenser is of the Adapter Type. The condensing tube is of Pyrex glass; length of straight portion 185 mm. of which 90 mm. is covered by the water jacket; diameter of tube (vertical section) 12–15 mm. The water jacket is of glass 110 mm. long by 45 mm. diameter, and is fitted with a glass drain tube closed by means of rubber tubing and a pinchcock.

The Support is a cast iron base with a 500 mm. rod. It carries two Bunsen clamps, one for the Flask and one for the Condenser, and a plate clamp with a hole 25 mm. diameter for supporting the Flask Shield.

The Receiver, U. S. Bureau of Standards Type, is a 100 ml. graduated cylinder made according to the specifications of the Manufacturing Chemists' Association and accurate to within 0.20 ml. As distillations of coal tars do not usually check to within 3%, this cylinder is well within the limits of legibility and the accuracy usually occurring in these analyses. (For Thermometer, see No. 6-955. For Burner, see No. 3-960.) Supplied without thermometer or burner. **Each, $10.50**

6-915. COAL TAR DISTILLATION FLASK, Pyrex, for No. 6-910 Coal Tar Distillation Apparatus, 250 ml. capacity, with dimensions as described under No. 6-910. **Each, $ .70**
Case lots of 48, 10% discount.

6-920. COAL TAR FLASK SHIELD, for No. 6-910 Coal Tar Distillation Apparatus, Iron, as described under No. 6-910. **Each, $2.00**

6-925. COAL TAR CONDENSER TUBE, for No. 6-910 Coal Tar Distillation Apparatus; Pyrex Condensing Tube only, as described under No. 6-910. **Each, $1.00**

6-930. COAL TAR CONDENSER JACKET, for No. 6-925 Coal Tar Condensing Tube, glass jacket only, as described under No. 6-910, without stopper or outlet tube. **Each, $ .75**

6-935. COAL TAR RECEIVER, U. S. Bureau of Standards Type, 100 ml. capacity, for No. 6-910 Coal Tar Distillation Apparatus, as described under No. 6-910. **Each, $2.50**

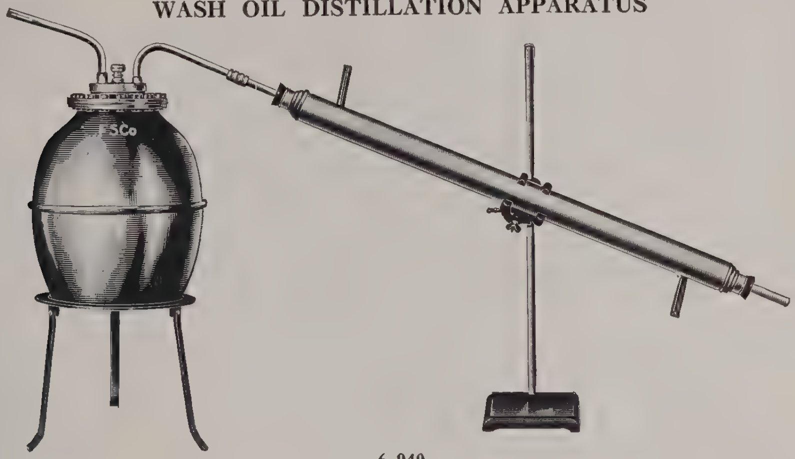
COAL TAR DISTILLATION THERMOMETER, A. S. T. M. High Distillation, 0 to 400° C., for use in No. 6-910 Apparatus. See No. 6-955.

6-936. CUP, Copper, for melting viscous oils, tars, etc., preparatory to measuring, transferring, etc., and to speed up dissolving of heavy tars and pitches in light oils. Cup made of copper, 1¾ inches diameter by 1¾ inches deep, with a handle 4¼ inches long riveted on. **Each, $2.25**

EVAPORATING DISH, Nickel, for the evaporation of tars, oils, etc., see No. 1-685.

6-938. WASH OIL STILL, 1 gallon; made of heavy copper, brazed; for distilling oils by steam. Provided with steam inlet tube extending across the inside bottom, perforated in rows. Top provided with cap, opening for thermometer and outlet tube. **Each, $30.00**

WASH OIL DISTILLATION APPARATUS



6-940

6-940. WASH OIL DISTILLATION APPARATUS, U. S. Steel Type. As made by us for the different U. S. Steel Laboratories and used for determining the quantity of light oil in wash or scrubber oil used in absorption towers, by the steam distillation method. This apparatus with Dephlegmator No. 6-965 is used by the Koppers Company, and is also recommended in the *Gas Chemists' Handbook, 251–1922.*

Apparatus consists of 3-gallon steam heated still, tripod for still, thermometer, union for connecting to condenser, brass condenser with copper condensing tube, and a support with clamp and holder for the condenser.

The Still is made of heavy copper, 14 inches high and 12 inches diameter and has a steam heating tube which enters at the top and extends along the bottom inside the still. This steam tube has two rows of small holes which divide the steam into a number of small jets. The still is brazed, not soldered, and has a brass head which is fastened to the body by stud bolts. A tripod of the proper diameter and height supports the still and is supplied under this number.

Thermometer, A. S. T. M. High Distillation, Centigrade scale. Range, zero to 400° C., subdivided in 1 degrees; made of normal thermometer glass and etched on the stem; length 380 mm. Made according to the specifications of A. S. T. M. Serial Designation D 86-24T.

Condenser is 30 inches long, made of brass and has a copper condensing tube made to specification. This condenser is connected to the still by means of the union supplied.

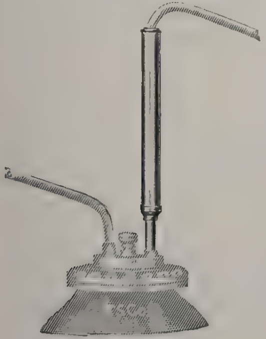
Support and Clamp with clamp holder supports the condenser as shown in the illustration.

Complete apparatus No. 6-940, as described. **Each, $71.00**

6-945. STILL only, for No. 6-940 Apparatus; 3-gallon capacity, as described under that number; with head, steam tube and outlet tube but without thermometer, union for connecting condenser or tripod. **Each, $55.00**

6-950. TRIPOD only, for No. 6-940 Apparatus, for supporting Still No. 6-945.................. **Each, $1.50**

6-955. THERMOMETER, A. S. T. M. High Distillation, Centigrade. Range, zero to 400° C. in 1 degree subdivisions. Used with and described under No. 6-940. Also used with No. 6-910 Coal Tar Distillation Apparatus. Thermometer only. **Each, $6.00**



6-965

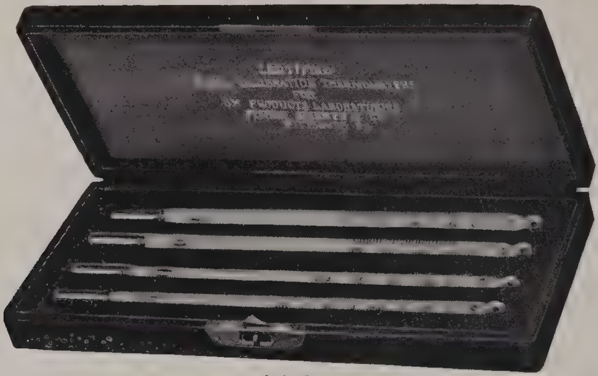
6-960. CONDENSER only, for No. 6-940 Apparatus. Made of brass with copper condensing tube. Condenser with tube, without union to connect still, without support. (If desired, a glass tube can be used in this condenser.) **Each, $7.00**

6-965. DEPHLEGMATOR. For use with No. 6-940 Apparatus. Made of brass 12 inches long over all, column 10 inches long by 1 inch diameter; to be filled with glass beads or other material to effect closer fractionation of the oils.

It is screwed into the outlet opening of the still and the upper end is connected to the condenser by a rubber stopper and the outlet tube of the still.

The Apparatus No. 6-940 with this Dephlegmator added, is used by The Koppers Company and is also recommended in the *Gas Chemists' Handbook*, American Gas Association, page 251–1922. **Each, $6.00**

Coal By-Products Testing Apparatus



6-975

6-975. THERMOMETERS, F. S. Co. Calibration, for Coal By-Products, Certified by U. S. Bureau of Standards. Recommended in the Standard Methods of the U. S. Steel Corporation.

In the distillation tests of By-Products, the temperature readings must be correct, and we recommend this set of control thermometers for checking and correcting every thermometer used in such tests.

There are four thermometers in the set and each thermometer is 150 mm. long, has a short bulb and has a limited range so that when the thermometer is immersed in the distillation vapors, the temperature bulb and the mercury thread are practically identical. Each thermometer is made of seasoned, normal thermometer glass, is calibrated for total immersion and each one has been checked by the United States Bureau of Standards and has a certificate from the Bureau. The ranges are as follows:

79 to 82 degrees C., graduated in $^1/_{10}$ degrees.
99 to 101 degrees C., graduated in $^1/_{10}$ degrees
109 to 112 degrees C., graduated in $^1/_{10}$ degrees.
136 to 142 degrees C., graduated in $^1/_{10}$ degrees.

The set is contained in a leather covered case, velvet lined. **Per set, $85.00**

THERMOMETER, F. S. Co. Standard, for Refined Products, see No. 6-875.

6-980. THERMOMETER, Koppers Type, for Pure Products. Range 70 to 120° Centigrade in $^1/_{10}$ degree subdivisions; length 450 mm., with short mercury bulb. Made of seasoned normal thermometer glass, nitrogen filled and very accurately calibrated, the 70 degree mark is 90 to 100 mm. above the bottom of the bulb.

The features are: Long stem with wide spaced graduations, short bulb and quick registering. **Each, $10.00**

6-985. THERMOMETER, F. S. Co. Standard, for Crude By-Products. Made of seasoned normal thermometer glass, etched on stem, filled with nitrogen, and accurate to ½ of a division. The bulb is short and quick acting; calibrated for total immersion. Length 400 mm.; range 0 to 250° Centigrade, graduated every 1 degree; the graduation marks are filled with black coloring insoluble in benzol vapors. **Each, $5.00**

6-990. THERMOMETER, F. S. Co., Freezing Point of Benzol. Used for the cold tests of benzol including the cloud, pour, freezing and melting tests. Sometimes called "Titer Test Thermometer."

Made of seasoned normal thermometer glass, etched on the stem, calibrated for total immersion. Length 375 mm.; range 0 to 65 degrees Centigrade, graduated in $^1/_{10}$ degree subdivisions. **Each, $8.00**

THERMOMETER, A. S. T. M. High Distillation, Range, zero to 400° C., see No. 6-955.
THERMOMETER, A. S. T. M. Low Distillation, Range, zero to 300° C., see No. 1-590.

7-015

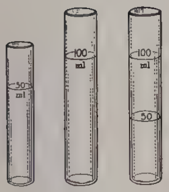
7-020

7-015. BENZOL COLOR STANDARD SET. Used in the Acid Wash Test, with Sulphuric Acid, as described in Test E-6 of The Barrett Company. See *Jour. of Ind. Eng. Chem., X, 1006, Dec., 1918.*

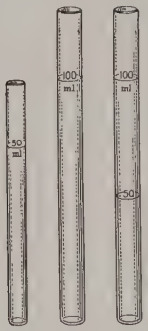
This set consists of fifteen one (1) ounce glass stoppered, colorless, flint glass bottles, square form. The bottles and stoppers are numbered so that the solutions once made may be sealed and used repeatedly. Bottles are mounted in a dust-proof case with partitions between the bottles to prevent breakage. Set of fifteen bottles in finished oak case, but without solutions. **Each, $10.00**

7-020. BENZOL COLOR STANDARD BOTTLE only. These bottles are the same as those supplied with the Benzol Color Standard Set No. 7-015, but are not numbered. **Per dozen, $ 2.00**
Per gross, $20.00

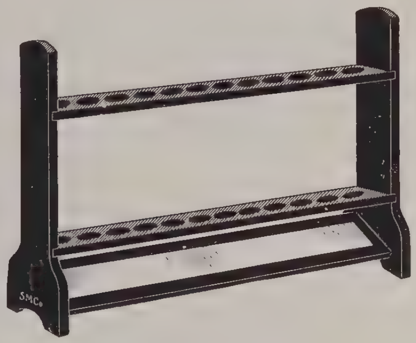
COLORIMETRIC APPARATUS



7-050



7-055



7-060
See also No. 7-065

REGARDING COLORIMETERS

A Colorimeter can be used for the rapid quantitative determination of a constituent of any liquid where the color and the constituent to be determined vary in any definite ratio.

The use of a Colorimeter in certain lines of analytical work is well established, but its wide application to many other analyses is not as yet fully appreciated. It is a piece of general apparatus and has a use in the laboratory comparable to that of the apparatus for gravimetric and volumetric measurements.

COATS, Aprons, etc. See pages 16 and 17.

7-050. COLOR COMPARISON TUBES, Nessler, Low Form; made of clear, colorless glass, with polished bottoms; used in Water Analysis, for the determination of nitrogenous materials. The tubes in sets are carefully selected to insure uniformity in the heights of the liquid columns, within small limits of variation.

The graduation marks are etched entirely around the tubes. The height of the mark on the 50 ml. tube is approximately 120 mm. The height of the 100 ml. marks on the 100 ml. and the 50–100 ml. tubes is about 150 mm. The tops of the tubes are fire polished.

Graduated at, ml	50	100	50–100
Height over all, mm	175	200	200
Diameter outside, mm	25	32	32
Per set of 2	**$1.50**	**1.75**	**2.00**
Per set of 6	**$4.50**	**5.25**	**6.00**

7-055. COLOR COMPARISON TUBES, Nessler, A.P.H.A. Standard, High Form; made of clear, colorless glass, with polished bottoms, according to the standard specifications of the American Public Health Association (*see A.P.H.A. Standard Methods of Water Analysis, 1920*).

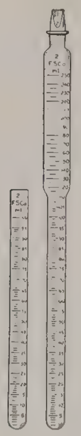
These are tall form Nessler tubes, with the graduation mark on the 50 ml. tube about 225 mm. high and the 100 ml. marks on the 100 ml. and the 50–100 ml. tubes, about 300 mm. high. In the selected sets of six and twelve, the 50 ml. mark, on the 50 ml. tube, and the 100 ml. marks, on the 100 ml. and 50–100 ml. tubes, are within 6 mm. of the same height. The tubes have circular graduations and are fire polished at the top.

Graduated at, ml	50	100	50–100
Height over all, mm	300	375	375
Diameter outside, mm	21	24	24
Per set of 2	**$1.50**	**1.75**	**2.00**
Per set of 6	**$4.50**	**5.25**	**6.00**
Per set of 12	**$9.00**	**10.50**	**12.00**

7-060. COLOR TUBE SUPPORT, for Low Form Nessler Tubes; made of wood, finished dull black, with white opal-glass reflector set at the correct angle to prevent shadows. The support is constructed so that the tubes rest on a narrow ledge and do not come in contact with the reflector. For 12 No. 7-050 low form 100 ml. tubes. **Each, $3.50**

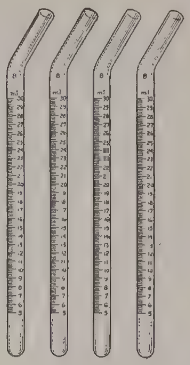
7-065. COLOR TUBE SUPPORT, for A.P.H.A. Standard Tubes; similar to No. 7-060, but made to take the standard tubes, high form, of the American Public Health Association.

For 12 A.P.H.A. Standard Tubes, ml	50	100
Each	**$3.50**	**3.50**



7-070

7-075



7-080

7-070. COLOR COMPARISON SET, Camp. Designed by J. M. Camp and made to his specifications. Recommended in the *Methods of Analysis of the U. S. Steel Corporation, for the Sampling and Analysis of Alloy Steel, 1921.* (*For Manganese, see page 22; for Titanium, see page 77.*)

The set consists of two glass tubes, graduated to agree for 100 ml. and subdivided into 1 ml. divisions. The larger, glass-stoppered tube is further graduated from 100 ml. to 250 ml. in 5 ml. divisions. The shorter tube is about 365 mm. high and the longer one is about 640 mm. high. **Per set, $7.50**

7-075. COLOR COMPARISON TUBES, Straight, Eggertz; used for the estimation of carbon and manganese in iron and steel analysis.

The tubes are made from carefully selected glass tubing, so that the corresponding graduations on the tubes in the same set are very nearly the same height. For identification, to keep the sets together, an individual set number is etched on each tube.

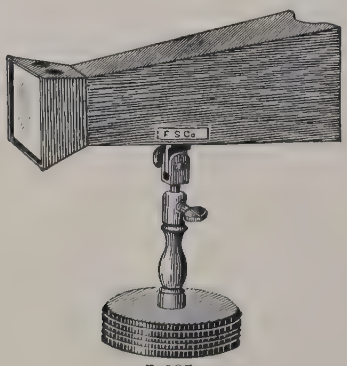
Graduated to, ml	30	50
Subdivision, ml	$^1/_{10}$	$^1/_{10}$
Height approx., mm	375	500
Per set of 2	**$3.00**	**3.50**
Per set of 4	**$6.00**	**7.00**

7-080. COLOR COMPARISON TUBES, Bent, Julian; used for the estimation of carbon and manganese in iron and steel analysis.

The tubes are similar to No. 7-075, but have the tops bent backward to facilitate mixing the contents, without the use of a stopper. The lower portions of the tubes have no graduation marks; this facilitates the color comparison.

Graduated, ml	5 to 30	10 to 50
Subdivision, ml	$^1/_{10}$	$^1/_{10}$
Height over all approx., mm	400	525
Per set of 2	**$3.50**	**4.00**
Per set of 4	**$7.00**	**8.00**

7-085. CAMERA, Color Comparator, Adjustable; used in the Colorimetric Method for the Estimation of Carbon and Manganese in iron and steel analysis. This camera will be found very convenient to support the color comparison tubes and to produce the correct daylight effect when comparing colors. Either the Eggertz straight tubes or the Julian tubes, with bent ends, can be used with the camera.

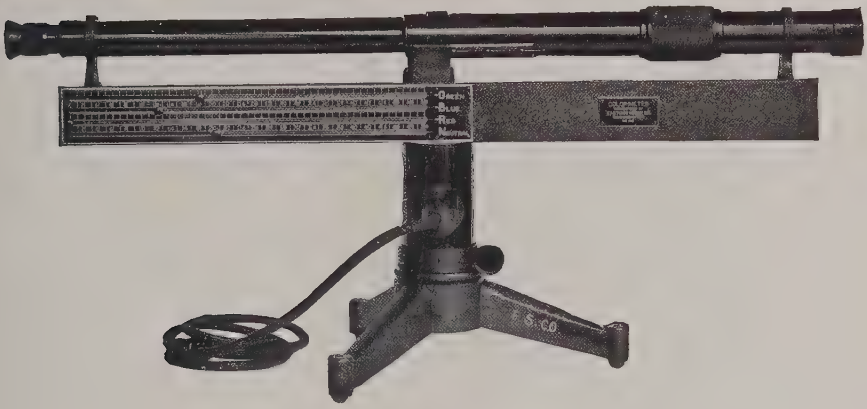


7-085

The color comparison tubes are placed in the comparator through the small holes in the top. They are viewed against a background of two removable glass plates, placed together, one of ground glass to diffuse the light and the other of cobalt blue glass to absorb the yellow rays and produce the daylight effect. The camera is painted flat black on the inside to prevent reflections. The observation end has a shield so that most of the extraneous light is eliminated, when making observations.

The camera is made of hardwood, mahogany finish, and stands on a substantial wooden base, 7 inches diameter. It measures about 18 inches long and stands 20 inches high at its lowest adjustment. The upright pillar has a 5-inch adjustment for height and also a device for tilting the camera, both of which are controlled by wooden thumbscrews. Supplied, without color comparison tubes. **Each, $18.00**

COLORIMETERS



7-090

7-090. COLORIMETER, Eastman Universal. Used for the measurement and numerical specification of color; particularly well suited for the measurement of colors of celluloid, colored fabrics, glass, oils, paints, paper, and food products.

This instrument matches the color of a sample with the light from a standard lamp, which has been passed through color filter wedges; each one of the wedges absorbs a primary color. There are three separate colored wedges, and by changing their positions in the scale, any desired amount of each of the primary colors may be subtracted from the standard white light. An additional neutral gray wedge permits the determination of the shade or tint of the color. The color is then identified by noting the position of the wedges as indicated on the scale. These scales read in a decimal notation, based on the most saturated color.

The standard light is obtained from a seasoned, calibrated electric bulb and a blue daylight filter. The lamp is operated from a 4-cell, 100 ampere-hour storage battery, and controlled by a Weston ammeter and a rheostat.

This instrument is, therefore, a true colorimeter and not a spectrophotometer. It actually measures a color in terms of its visual appearance, and not by spectroscopic analysis.

Used without any attachments, the colorimeter is a telescope, and needs only to be focused on the object whose color is to be measured. It is used in this way by illumination engineers and interior decorators to measure the color of the walls of theatres, museums, libraries, etc.

The instrument is very simple to operate, and has a minimum of mechanical and optical parts. It is of very rugged construction, and finished in black enamel and crystallized lacquer.

Eastman Universal Colorimeter with ammeter and rheostat in a case, a reference standard with seasoned and calibrated lamp, and three seasoned lamps for use as secondary standards; without battery. **Each, $350.00**

7-095. COLORIMETER ATTACHMENT, for holding reflecting surfaces. Used with Colorimeter No. 7-090 for measuring the colors of fabrics, paper, yarn, etc. The attachment has a receptacle for holding one of the secondary standard lamps supplied with the colorimeter. This attachment fits over the end of the telescope. **Each, $20.00**

7-100. COLORIMETER ATTACHMENT, for holding liquids. Used with Colorimeter No. 7-090 for measuring the colors of oils, dyes, inks and other liquids. This is a clamp which fits over the end of the telescope and has a glass cell for the liquid. It can also be used for transparent solids. **Each, $50.00**

7-105. COLORIMETER CYLINDER, for holding liquids with little color. Used with Colorimeter No. 7-090. This is a glass cylinder, 10 cm. deep, with optically flat ends and automatic depth adjustment. It is used in attachment No. 7-100. **Each, $15.00**

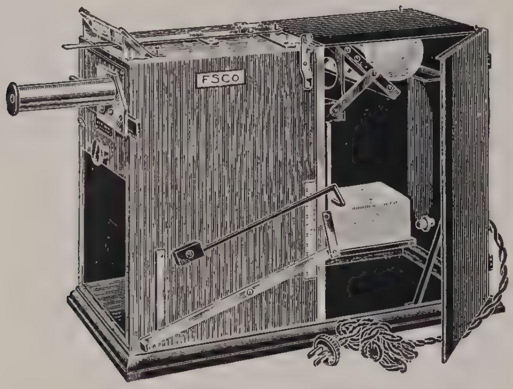
7-110. COLORIMETER ATTACHMENT, for holding transparent solids or liquids of deep colors. Used with Colorimeter No. 7-090; holds liquid cells not exceeding 1 cm. in thickness. For testing glass, celluloid, etc., or liquids with a large amount of color. **Each, $20.00**

7-115. COLORIMETER ATTACHMENT, Tint-Intensifier. Used with Colorimeter No. 7-090 for measuring colors differing only slightly from white. This attachment utilizes the principle of multiple reflections and intensifies the tints which are scarcely distinguishable from pure white, so that they are easily read on the colorimeter. **Each, $150.00**

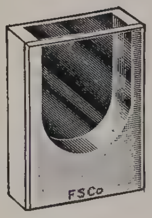
7-120. COLORIMETER ATTACHMENT, Lamp House. Used with Colorimeter No. 7-090 for illuminating the different attachments, except No. 7-115 which has its own illuminating system. **Each, $20.00**

7-125. COLORIMETER LAMP, for Colorimeter No. 7-090. This lamp is carefully seasoned and may be easily standardized by the operator against the standard lamp supplied with the instrument. This serves as a reference standard for each test, permitting the standard lamp to be reserved for standardizing purposes only. **Each, $2.50**

IVES TINT PHOTOMETER



7-130



7-135

7-130. COLORIMETER, Ives Tint-Photometer, with monochromatic color screens; for measuring the color of solids and liquids in terms of per cent of monochromatic light by matching their color against light of definite composition. This instrument is used for the analysis of the color in:

Celluloid
Clays
Cotton
Dyes
Flour
Glass
Glucose
Glue
Inks
Lacquers
Lards
Leather
Margarine
Molasses
Oils
Oil Cloth
Paint
Paper
Pastes
Pigments
Pulp
Rubber
Silk
Soap
Syrups
Tallow
Textiles
Varnish

Construction. The Colorimeter consists of a lightproof photometric dark chamber containing a white glass photometer lamp with a polished surface, also two pure white magnesia blocks. The light from the lamp falls upon one magnesia block and is reflected by a mirror into one half of an observation eyepiece. Another portion of the light is brought into a beam of parallel rays by means of two condensing lenses and reflected by a mirror into the other half of the eyepiece. This portion of the light constitutes the standard for white light and is varied in intensity by opening or closing a slit through which it passes. The slit is calibrated in terms of per cent of light admitted. A slot, between the eyepiece and the dark chamber proper, serves as a support for the standard color screens. Five monochromatic color screens are provided: Red, Yellow, Green, Blue-green and Blue-violet.

Operation. To make a reading, the sample under investigation is placed on the first magnesia block and a color screen of the corresponding color placed in the slot. The fields are then matched by moving the lever which opens the light slit until the two fields of the eyepiece are matched.

Many liquids and solids, which are substantially constant in hue but of various intensities, can be matched by using a single screen. Others should be measured by using two or more screens. In each case the color as finally matched, is noted in terms of per cent of the monochromatic colors employed. In this manner each color can be represented as a numerical quantity and can therefore be duplicated at any time.

Where the color of a liquid is to be analyzed, an optical glass cell containing the liquid, is placed in the path of light impinging upon the first magnesia block and the color analysis made in the same manner as outlined above for solids. This instrument will accommodate cells up to 20 mm. in depth.

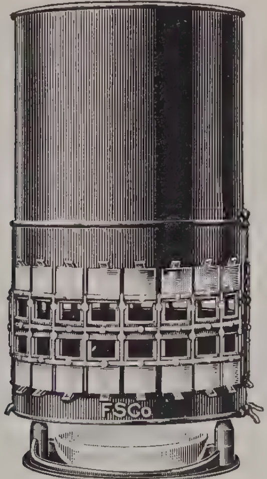
Ives Tint-Photometer No. 7-130, with photometer lamp, two magnesia blocks and five monochromatic color screens; for use on 110 volt current; without glass cells. **Each, $175.00**

7-135. CELLS, for Tint-Photometer No. 7-130, of optical glass, for holding the liquids whose colors are to be determined.

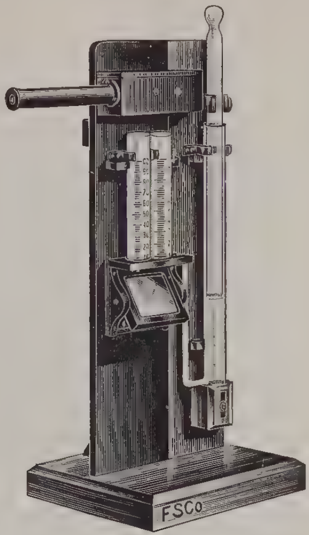
Depth, mm.	3	6	10	15	20
Per pair	**$4.50**	**4.90**	**6.60**	**8.20**	**10.90**

7-140. PHOTOMETER LAMP, for use in the Ives Tint-Photometer No. 7-130. Extra 110 volt lamp of white glass with polished surface, for replacement. **Each, $3.00**

7-145. PHOTOMETER MAGNESIA BLOCK. Extra block for use in the Ives Tint-Photometer No. 7-130. **Each, $ .20**



7-150



7-155

7-150. COLOR FADE-OMETER, for the rapid determination of the fastness of colors to light. The Fade-Ometer utilizes the light from a carbon arc to bleach or fade the colors of dyes, paints, inks, pigments, cloths, papers, celluloid, etc.

The arc plays between special electrodes and develops a spectrum very similar to the sun. Because of the temperature of the arc, the rays will penetrate glass, and thereby eliminate the necessity for quartz lamps. These rays will affect all colors and produce chemical reactions similar to those caused by the sun.

The effect of this light is about four times that of standard summer sunlight. The light is automatically controlled, and therefore constant, and can be operated continuously by changing the carbons about every thirty hours.

This instrument provides a standard means of making laboratory tests for fastness of colors, independent of weather conditions or locality. Such tests can be made with a great saving in time, and the results are the same regardless of when and where the tests are made.

The samples to be tested are placed in the forty individual holders (2¼x4½") mounted on a circular drum around the arc. A portion of the sample may be protected from the light and comparison with the exposed portion made. *The illustration shows the drum lowered.*

Beneath the lamp is a humidifier which maintains constant humidity within the drum. Entire apparatus is self-contained, requiring only the connection of its two conductors to the source of current. The arc draws thirteen amperes at 220 volts, or about 2.9 K.W. When ordering, state kind of current available, give the voltage, phase and number of cycles, and state the nature of material to be tested.

A.	Fade-Ometer, 110 volt D.C.	**Each, $365.00**
B.	Fade-Ometer, 220 volt D.C.	**$340.00**
C.	Fade-Ometer, 110 volt A.C., 40 to 133 cycle, including transformer	**$390.00**
D.	Fade-Ometer, 220 volt A.C., 40 to 130 cycle, (transformer not necessary)	**$340.00**

7-155. COLORIMETER, K.C.H. (Kennicott, Campbell and Hurley). For the determination of carbon or manganese in steel, effective color content of dyes, suspended matter in liquids, filter press and beater filtrates, etc. This colorimeter is recommended for use as a general utility instrument where a relatively large quantity of liquid is available. It is frequently used for control of factory operations.

Operation. In this colorimeter, light from a single source of illumination is reflected by a mirror through two tubes; one holds the unknown, the other the standard liquid. The light transmitted by these is then reflected by mirrors into an eyepiece where their images appear side by side. The two colors are matched by varying the depth of the standard liquid under observation. This is done by forcing the liquid from the reservoir into the tube by means of the hand operated plunger. The concentrations of the two liquids are then inversely proportional to the depths of liquid under observation.

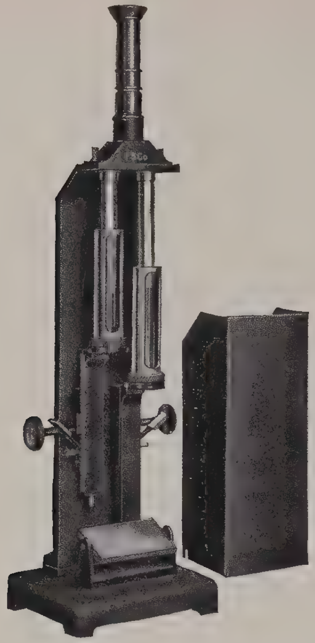
Construction. The colorimeter tubes and reservoir for the standard solution, are attached to an upright board mounted on a heavy wooden base. The tube for the unknown is of glass 185 mm. long, 30 mm. inside diameter, graduated in per cent, in 10% divisions. The tube for the standard solution is of the same dimensions as the other tube, but is graduated in per cent, in 1% divisions, and has an outlet tube directly connected to the glass reservoir. The plunger of the reservoir is of hollow glass construction. Mirrors above the tubes, reflect their images into the observation tube.

The entire colorimeter is 25 inches high by 12 inches wide by 11 inches deep, is of very sturdy construction and has been designed for rapid manipulation and convenient operation. **Each, $35.00**

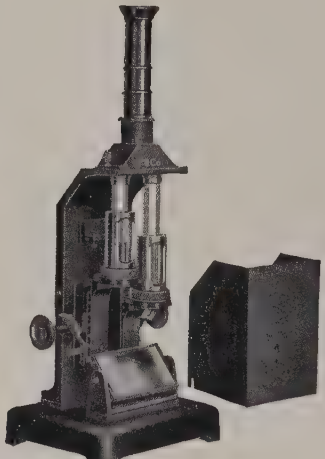
7-156. TUBE, for Colorimeter No. 7-155. Extra tube graduated in 10% divisions. (*The tube illustrated on the left of the colorimeter.*) **Each, $1.50**

7-157. TUBE, for Colorimeter No. 7-155. Extra tube graduated in 1% divisions, with leveling system attached. (*The tube illustrated on the right of the colorimeter.*) **Each, $6.00**

B & L—DUBOSCQ COLORIMETERS



7-160



7-165

7-160. COLORIMETER, B. & L., Duboscq, 100 mm. size. For general colorimetric analysis. We recommend this American Colorimeter because of its improved optical design and its sturdy and precise mechanical construction.

Uses. This colorimeter determines the composition of a liquid by measuring the intensity of coloration of light transmitted through the liquid. The measurement is made by comparing the color of the unknown, with the color of a known standard solution. Colorimetric analysis of a liquid may be made in all cases where the color of the liquid is sufficiently stable to last during the measurement.

This type of colorimeter was originally designed by Jules Duboscq, but this particular instrument has been improved and redesigned. Its use is displacing many of the older, laborious, time-consuming methods of analysis. It is recommended for the determination of titanium, manganese and carbon in steel and aluminum, bismuth, antimony, fluorene, copper and gold in ores. Lead and iron may be detected in quantities as low as two to three parts per million. Dyes and inks may be analyzed for effective color content.

In the biological and medical field, this colorimeter finds daily use in blood and urine analysis, while some of the kidney function tests have come to depend almost entirely upon it. In every field of analytical chemistry, new uses are being continuously revealed. The very simplicity of the instrument encourages its use.

Operation. Light from the source of illumination is passed through both the standard liquid and the unknown liquid. The emergent beams of light are then brought into the eyepiece by means of overlapping prisms and each illuminates one-half of the circular field of vision.

The amount of light absorbed will vary with the depth of the liquid through which it passes. The depth of the unknown liquid is varied by raising or lowering the cup, until its color matches that of the known liquid and the depths of both liquids are read on the scales. The concentrations of the two liquids are inversely proportional to these depths.

Construction. The observing microscope is of four lens construction, designed to focus on the line of division between the two fields. A diaphragm in the eyepiece limits the aperture and eliminates reflections.

The compound prism consists of two overlapping rhomboids with silvered interior faces. This construction gives a very thin line of demarkation between the two fields. The line practically disappears when the fields correspond. The two plungers are solid glass, hexagonal in shape, matched for color, with optically plane and parallel ends.

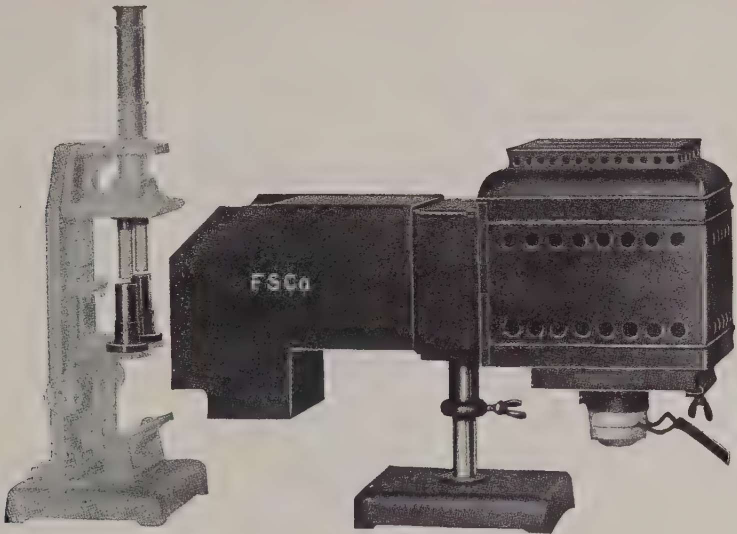
The two cups are glass cylinders with optically plane glass disc bottoms which are held in place by metal bushings which screw to the armored casings of the cylinders. These cups are raised and lowered by means of rack and pinion gears, and the depth of the liquid is indicated by a scale on the side. This scale indicates the depth of liquid up to 100 mm., is graduated in 1 mm. divisions and can be read to $^{1}/_{10}$ mm. by means of the vernier. The scale is reflected up beside the eyepiece by a mirror attached to the vernier.

The reflector below the tubes has two surfaces; one a plain mirror and the other a plate of finely ground opal glass. **Each, $165.00**

7-165. COLORIMETER, B. & L., Duboscq, 50 mm. size. This instrument is the same as No. 7-160, and corresponds with the description given under that number, except the cups, plungers and scales are made for measuring liquid depths up to 50 mm. **Each, $125.00**

7-170. COLORIMETER CUPS, for B. & L. Duboscq Colorimeters. Complete armored cups for replacing those on Colorimeters Nos. 7-160 and 7-165.

Size, mm.	50	100
Each	**$5.50**	**8.00**



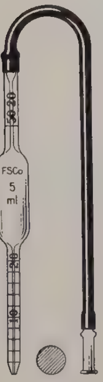
7-175 7-180

7-175. NEPHELOMETER ATTACHMENT, 100 mm. size, for Colorimeter No. 7-160. By adding this attachment, the colorimeter becomes a Nephelometer, which is used for the quantitative analysis of a liquid by comparing its translucency, or turbidity, with that of a known liquid. In this case the light is introduced from the side and is reflected from the particles in suspension in the liquid, and observed in the eyepiece of the colorimeter.

This attachment consists of an electric lamp, lamp housing, condensing lenses and lightproof housing which fits over the colorimeter; all mounted on an adjustable stand. There are two glass stoppers which replace the plungers of the colorimeter; two glass vials which replace the cups as containers, two clamps for holding the vials and two tubular light-shields.

The illustration shows the lamp and a colorimeter with the vials supported from the top, and the light-shields on the elevating platforms. As the light-shields are raised, the depths of liquid illuminated decrease. Complete Attachment, as described. **Each, $90.00**

7-180. NEPHELOMETER ATTACHMENT, 50 mm. size. Same as No. 7-175, but made for measuring depths of liquids up to 50 mm. Used with Colorimeter No. 7-165. **Each, $75.00**



7-185

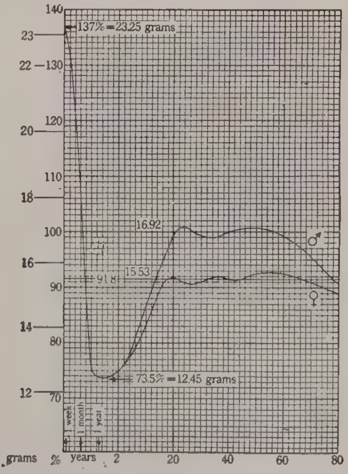
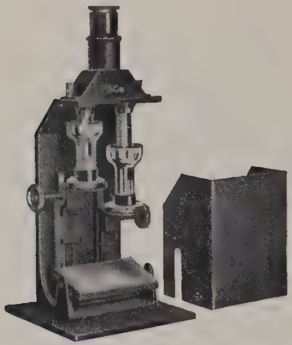


Chart of Hemoglobin Values—Birth to Old Age

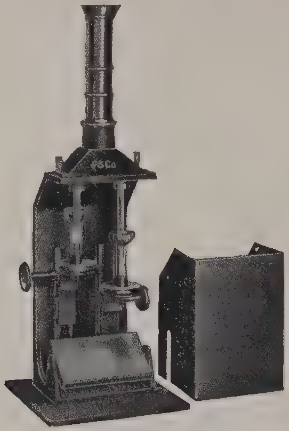
7-185. HAEMOGLOBINOMETER ATTACHMENT, for use with Colorimeters Nos. 7-160 and 7-165.

This consists of a circular disc of standard haemoglobin color value which is placed in a slot provided at the top of one of the plungers. A special diluting pipette is supplied, also a chart for converting the colorimeter readings into percentage of haemoglobin.

This attachment used with a colorimeter, makes it a complete Haemoglobinometer. **Each, $7.00**



7-190



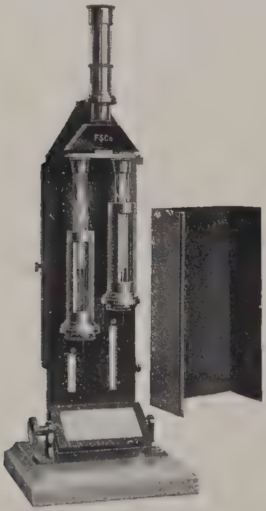
7-195

7-190. COLORIMETER, B. & L. Biological, Double Adjustment, hollow plungers, flared cups. This colorimeter has been designed especially for use in the medical laboratory. It is similar to the standard Duboscq Colorimeter No. 7-160 in its operation and optical design, but it is smaller and less expensive. Liquid depths up to 40 mm. can be measured and tests can be made with volumes as small as one (1) ml.

The plungers are hollow cylinders with optically plane discs fused on the bottoms. The cups have flared tops to take care of the overflow, and have optically plane discs fused on the bottoms. Both cups are adjustable for liquid depths. The details of operation are described under No. 7-160. **Each, $75.00**

7-195. COLORIMETER, B. & L. Micro, Double Adjustment. This colorimeter has been especially designed for the colorimetric analysis of liquid where only small volumes are available. It is similar to No. 7-190 in appearance, optical design and mechanical construction.

The cups have a capacity of one (1) ml. and are adjustable for liquid depths of 20 mm. The details of operation are the same as described under No. 7-160. **Each, $85.00**



7-200

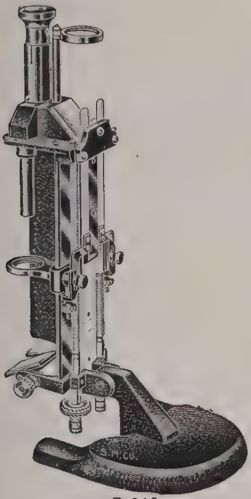
7-205

7-200. COLORIMETER, Duboscq-Pellin, 100 mm. size. This is the original Duboscq Colorimeter made for us by Pellin in France. The uses of this colorimeter are the same as noted under No. 7-160 and the operation is similar.

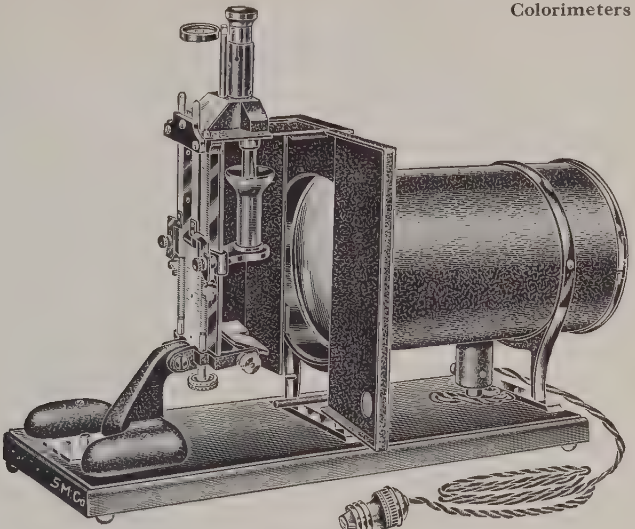
The mechanical design and construction of this colorimeter will be observed from the illustration. It differs from the B. & L. Colorimeter as follows: the Scales, indicating the depths of the liquids, are on the rear of the instrument; the Eyepiece is of four-lens construction; the Plungers are octagonal; the Glass Cups have cemented bottoms; and the slots, for inserting the glass color-filters, are just below the prisms, arranged so that the color-filters can be inserted or removed without dismantling the plungers.

The colorimeter is supplied with eight color-filters; two each of red, yellow, blue and green. Two ground glasses are also furnished to be used when comparing pale tints. **Each, $149.00**

7-205. COLORIMETER, Duboscq-Pellin, 50 mm. size. This is the same as No. 7-200 except that the cups, plungers and scales are made for measuring liquid depths up to 50 mm. **Each, $92.00**



7-210



7-215

7-210. COLORIMETER, Klett, with Top Reader, 100 mm. size. This colorimeter is of the Duboscq type and though less expensive compares favorably with the original instrument. The new device for reading the scales from the top, is very convenient. The observing microscope is of three lens construction with an eye rest which serves as a diaphragm for limiting the field area and eliminating any disturbing reflections. With this construction the two fields appear in the eyepiece exactly as they actually are. There is no field reversal as is ordinarily experienced in this type instrument.

Reflecting Prisms. The reflecting prisms are solid pieces of glass. The ends of the prisms overlap, giving a definite line of demarkation between the two fields and are so placed that the beams of light enter the eyepiece alongside each other, facilitating the matching.

Plungers. The plungers are made of black tubing with fused-on bottoms of clear glass, and thus transmit more light than the solid glass plungers. They are attached to the instrument by means of threaded metal adapters.

Cups. Cups are made of black glass tubing with fused-on bottoms of clear glass. The upper end of the cup is flared to avoid the overflowing of the contents when the cups are raised. Cups are raised or lowered by knurled thumb screws at the top of the instrument, which actuate screw drives to the cup platform. This eliminates all danger of having the platform drop during reading and insures a definite zero point without any mechanical slip or lag. Cups will accommodate liquid depths of 100 mm. For additional cups, see Nos. 7-220 and 7-225. The scales are mounted on the back of the support and are stationary while the verniers are movable, and are attached to the platforms. The verniers may be reset for zero point by a single screw adjustment. Total scale length 120 mm. in 1 mm. divisions with vernier reading to 0.1 mm.

Top Reader. The scales of the latest model, are reflected through a mirror on the top of the prism housing into a magnifier placed near the eyepiece. Thus an enlarged view of the scale is obtained without inconvenience to the observer.

The Mirrors. Two adjustable mirrors are provided for adjusting for different light conditions. Slight turbidity of unknown solutions, which absorbs light, can be neutralized by adjusting these light reflecting mirrors. Colorimeter supplied with one (1) pair of Colorimeter Cups, as described. **Each, $90.00**

7-215. COLORIMETER AND NEPHELOMETER, Combined, Klett. This is Colorimeter No. 7-210 provided with a source of light and an extra pair of cups of white glass with black bottoms. The lamp can be used for intense illumination for colorimetry, or its rays can be directed through the sides of the nephelometer cups and the instrument used as a nephelometer. It is then adapted for the quantitative analysis of a liquid by comparing its translucency or turbidity with that of a known liquid.

The illuminator consists of an electric bulb and a condensing lens in a lightproof housing which has a shield for covering the colorimeter. The illuminator is mounted on a wooden base which has a place provided for taking the colorimeter; a very convenient arrangement.

There are two pairs of cups provided; one pair of black glass with clear glass bottoms for 100 mm. depths, and one pair of clear glass with black glass bottoms for 100 mm. depths.

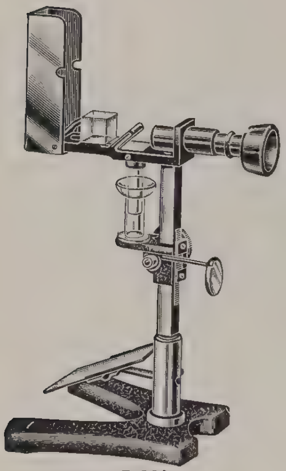
Complete outfit with colorimeter and illuminator. For 110 volt current. **Each, $135.00**

7-220. COLORIMETER CUPS, Klett. Used with Colorimeter No. 7-210. Made of black glass with optically plane, clear glass discs fused on the bottoms. The tops are enlarged to prevent overflowing.

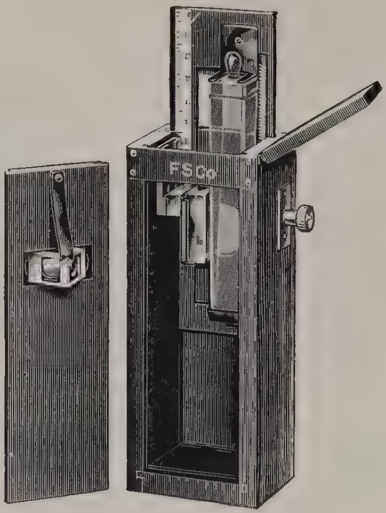
For liquid depths, mm	50	100
Per pair	**$4.50**	**4.50**

7-225. NEPHELOMETER CUPS, Klett. Used with Nephelometer No. 7-215. Made of clear glass with black glass discs fused on the bottoms. The tops are enlarged to prevent overflowing.

For liquid depths, mm	50	100
Per pair	**$4.50**	**4.50**



7-230
See also No. 7-235



7-240
See also No. 7-255

7-245

7-230. COLORIMETER, Bock-Benedict. Designed for general Biological analysis by Dr. J. C. Bock and Dr. S. R. Benedict of Cornell University. (*See Journal of Biological Chemistry, August, 1918.*) In this instrument, the standard is placed in a fixed standard cell, 8x10 mm. or 15x20 mm., while the unknown is placed in a colorimeter cup similar to that used in the Duboscq Colorimeter.

The cup of the instrument is small and selected to closely fit the plunger, satisfactory comparisons may be made with 2 ml. of liquid, as small an amount as can be handled in micro-colorimeters. The depth of the unknown is varied until its color matches that of the known, and then the depth is read on the scale on the front of the instrument.

The images of the known and unknown liquids are projected into the eyepiece by mirrors. The color of the standard and that of the unknown are brought side by side in the eyepiece to facilitate comparison.

The simplicity of its construction and its accuracy make this colorimeter a handy, reliable instrument for general biological work in both clinical diagnostic laboratories and in medical schools.

Colorimeter is supplied with the 8x10 mm. cell unless otherwise specified.

Bock-Benedict Colorimeter, complete with plunger, cup for the unknown, and one 8x10 mm. cell for the standard. **Each, $40.00**

7-235. COLORIMETER CELLS, for Bock-Benedict Colorimeter No. 7-230.

Size, mm.	8x10	15x20
Each	**$2.30**	**2.30**

7-240. COLORIMETER, Hellige, Universal, Wedge Type. A small and compact instrument; 7x2x2¾ inches which can be completely enclosed and can be carried in the coat pocket.

Uses. This colorimeter can be used for nine different tests in blood analysis; seventeen different tests in urine analysis; seven different tests in food analysis and for various other clinical tests. It can also be used for the analysis of any liquid in which the color varies directly as the constituent to be determined.

A modification of this instrument is made especially for water analysis, and is listed under No. 7-255.

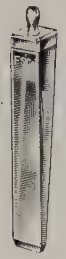
Description. A rectangular glass trough of standard dimensions used for the sample of the unknown liquid, is mounted on the left side of the case. A glass wedge on the right, contains the standard known liquid, and fits into a clamp on the rear of the case which is raised or lowered by a rack and pinion, operated by the screw on the outside of the case. A scale graduated in 100 divisions is mounted on the rear and moves with the wedge; a fixed pointer indicates on the scale the per cent of concentration of the unknown liquid in terms of the known liquid.

The illumination enters through a white glass window in the rear; the light passes through both liquids and their images are brought side by side by two optical prisms and observed through the rectangular aperture in the front.

A choice of normal wedges for use with this colorimeter can be made from those listed under No. 7-250, or empty wedge No. 7-245 can be filled by the operator with any known solution desired and used as a standard.

Colorimeter No. 7-240, as described, with trough but without any wedges. **Each, $30.00**

7-245. EMPTY WEDGE, for Colorimeter No. 7-240. Glass wedge, optically plane, clear glass surfaces front and rear; the side surfaces are ground glass. This wedge is filled through an opening in the top and is provided with a ground glass stopper. **Each, $10.00**



7-250
See also No. 7-260

7-265

7-250. NORMAL WEDGES, Filled, for Colorimeter No. 7-240. Each of these wedges is filled with a solution and is a color standard for the particular test designated. Each wedge is furnished with detailed directions for the analysis for which it is to be used. (*Give wedge number when ordering.*) All wedges are the same price.

FOR BLOOD ANALYSIS

Wedge No.	*Test*	*Wedge No.*	*Test*	*Wedge No.*	*Test*
1	Haemoglobin	4	Iron	7	Creatinine
2	Sugar	5	Cholesterin	8	Nitrogen
3	Uric Acid	6	Bromide		

FOR URINE ANALYSIS

Wedge No.	*Test*	*Wedge No.*	*Test*	*Wedge No.*	*Test*
10	Glucose	16	Renal Function	22	Iodine
11	Milk Sugar	17	Salicylic Acid	23	Volatile Phenols
12	Uric Acid	18	Acetone	24	Mercury
13	Creatinine	19	Aceto-acetic Acid	25	Bromide
14	Creatin	20	Albumin	26	Nitrogen
15	Indican	21	Azote		

FOR FOOD ANALYSIS

Wedge No.	*Test*	*Wedge No.*	*Test*
35	Salicylic Acid	39	Ammonia
36	Alumin	40	Phenols
37	Milk-Sugar	41	Formaldehyde
38	Iron		

FOR MISCELLANEOUS TESTS

Wedge No.	*Test*
50	Total Contents of Albumin, Globulin and Serumalbumin in Blood Serum, Urine and Ascites Liquids
51	Bilirubin in Blood Serum
52	Rhodan in Sputum
53	Iodine in the Scutiformed Glandula
54	Adrenalin in accessory Kidneys (Suprarenin)

Each, $20.00

7-255. COLORIMETER, for Water Analysis, Hellige. This colorimeter is the same as No. 7-240, except that it has a larger trough and is designed to take the longer wedges No. 7-260.

Colorimeter with long trough but without any wedges. **Each, $40.00**

7-260. NORMAL WEDGES, Filled, for Colorimeter No. 7-255. Used in water analysis for the tests designated and supplied with directions for that test.

Wedge No.	*Test*	*Wedge No.*	*Test*
60	Ammonia (Requiring a long wedge)	67	Sulphuretted Hydrogen (Requiring a long wedge)
61	Nitrous Acid	68	Phenols
62	Nitric Acid	69	Mercury
63	Sulphurous Acid	70	Titanium
64	Iron	71	Chromate
65	Copper	72	Chloride
66	Lead (Requiring a long wedge)	73	Vanadium

Each, $20.00

7-265. COLORIMETER LAMP, B. & L. This lamp can be used with various types of colorimeter; it provides the proper quantity and the daylight quality of light necessary for colorimetric determinations.

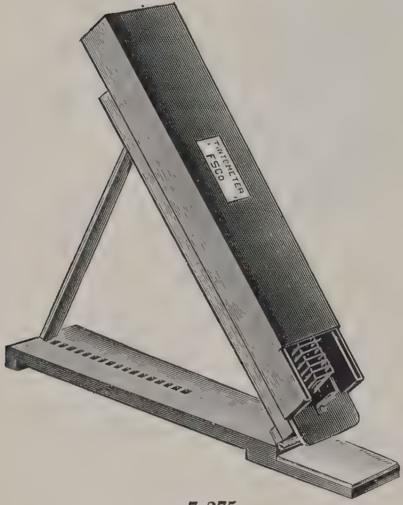
The source of light is a 100-watt, gas-filled bulb of the stereo type; the socket for this bulb is adjustable for centering the filament. The housing is ventilated and is arranged to allow sufficient light to fall on the desk so that notes can be made. The window is Corning-Daylite glass, one side of which is ground; this provides diffused light of a pure white quality.

Complete Lamp, with cord, switch and plug; for 110 volt current. **Each, $22.50**

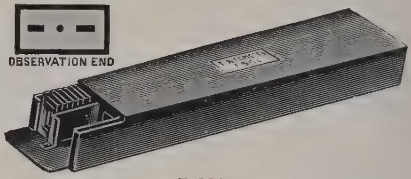
7-270. BULB, for Colorimeter No. 7-265; for replacement; for 110 volts.......... ....**Each, $2.00**

LOVIBOND TINTOMETER

LOVIBOND COLOR VALUES
have been used as standards for many years,
because they can be accurately
reproduced.



7-275



7-280

7-275. COLORIMETER, Lovibond Tintometer. This instrument is used to accurately measure, in degrees, the depth of color in liquids and solids. By means of the Lovibond Standard Color Glasses, used with the Tintometer, any degree of color can be registered for reproduction at any time. The Tintometer demonstrates that color is one of the most constant properties of substances and that variation in color is an index of variation in other properties also. In many cases, a colorimetric determination gives the quickest and surest index to the absolute value of materials for commercial purposes.

The Tintometer consists of a light-proof housing, painted black inside to prevent reflections and divided into two compartments. The colored light from the object to be measured is transmitted through one compartment and the light from a standard white background through the other. This white light is intercepted by Lovibond Standard Color Glasses until it corresponds in color with the object to be measured. The numerical color value of the glasses used is then noted for future reference.

The source of light should be ordinary daylight, from a northern exposure if possible, but not direct sunlight.

The Lovibond Standard Color Glasses (*supplied extra, according to the colors desired, see No. 7-285*) are manufactured and tested to agree with standard units of color, which are derived from carefully measured wave lengths of the diffraction spectrum, and form an accurate basis for colorimetric determinations. The adaptability of the eye to perceive variations in color varies considerably with time of observation. It is imperative, therefore, to limit the observation to a fixed time, for which five seconds will be found convenient. With various combinations of accessories and the properly selected Lovibond Standard Color Glasses, this Tintometer can be used in many laboratory operations, including colorimetric testing of the following:

Petroleums
Lubricating Oils
Cotton Seed Oil
Waxes, Lards and Fats
Resins and Varnishes
Gelatines and Scales
Flour Milling Operations
Dyes and Inks
Fabrics and Yarns
Sugars and Caramels
Tanning Solutions
Impurities in Water

For the measurement of color in liquids, the Tintometer, on its brass stand, can be used with troughs having lengths up to and including one (1) inch. When troughs of greater lengths are viewed, the Tintometer is removed from its brass stand, placed upon a convenient support and the light reflected through the trough by Reflector No. 7-300.

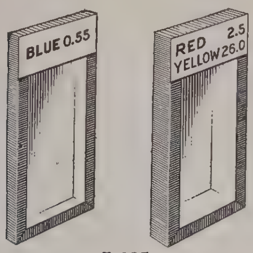
For the measurement of color in opaque substances, the Tintometer is used on its Brass Stand together with suitable Wooden Blocks, Powder Trays, etc., for holding the samples. (*See No. 7-305, No. 7-315 and No. 7-320.*)

The Tintometer is made of bronzed metal and is designed so that it can be used either as a monocular or a binocular. Supplied with adjustable brass stand, but without Lovibond Standard Color Glasses, Wooden Blocks, Powder Trays, Powder Compressor, Standard White Reflector, or Metal Troughs.

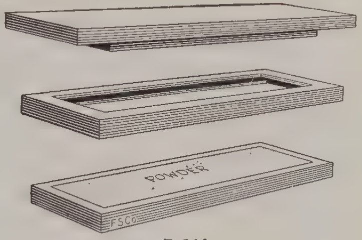
Each, $50.00

7-280. COLORIMETER, Lovibond Tintometer, without Brass Stand. This is exactly the same instrument as No. 7-275, except that the brass stand is not supplied. The Tintometer, in this form, is used for the examination of liquids in troughs measuring more than one (1) inch in length. The Tintometer is placed upon a convenient support and used with mounted White Reflector No. 7-300.

Supplied without Brass Stand or White Reflector. **Each, $35.00**



7-285



7-310

7-285. COLOR STANDARDS, Lovibond Standard Color Glasses; made in various shades and tints to match any color. For each of the three spectrum colors—red, yellow, and blue—there is a series of one hundred fifty-five (155) standard glasses, graduated from 0.01 to 20.00 tint units, making four hundred sixty-five (465) color glasses in all. The intervals between the units, or main divisions of the scales, are the smallest differences between which the normal vision can discriminate in the deeper shades of glass colors. These are subdivided into tenths as the shades get lighter and ultimately into hundredths in the very light shades. The tint units are derived from the wave length values of the diffraction spectrum, which lie between A-760400 and H-396319. When examining oils in the standard 4-ounce Oil Sample Bottle, the following table shows the relation between the newer American designations and the Lovibond analysis:

A.S.T.M. Color Numbers	Alphabetic Designations	N.P.A. Color Numbers	N.P.A. Names	LOVIBOND ANALYSIS Red 200 Series	Yellow 510 Series	Blue 1180 Series
1	G	No. 1 N.P.A.	Lily White	0.12	2.4	
1½	H	No. 1½ N.P.A.	Cream White	0.60	8.0	
2	I	No. 2 N.P.A.	Extra Pale	2.5	26.0	
2½	J	No. 2½ N.P.A.	Ex. Lemon Pale	4.6	27.0	
3	K	No. 3 N.P.A.	Lemon Pale	6.9	32.0	
3½	L	No. 3½ N.P.A.	Ex. Orange Pale	9.4	45.0	
4	M	No. 4 N.P.A.	Orange Pale	14.0	50.0	0.55
4½	N	No. 4½ N.P.A.	Pale	21.0	56.0	0.55
5	O	No. 5 N.P.A.	Light Red	35.0	93.0	
6	P	No. 6 N.P.A.	Dark Red	60.0	60.0	0.55
7	Q	No. 7 N.P.A.	Claret Red	60.0	106.0	1.8
8	R	No. 8 N.P.A.	Ex. Dark Red	166.0	64.0	
A	A	A Cylinder Oil	Ex. Light Filtered	10.2	29.0	
D	D	D Cylinder Oil	Light Filtered	21.0	31.0	
E	E	E Cylinder Oil	Medium Filtered	89.9	56.0	

Compound color standards are made by combining two different Lovibond Standard Color Glasses. These compound glasses are double the price of the single glasses. If a compound standard is desired instead of two single glasses, be sure to so specify when ordering. (*See Note No. 1 and Note No. 2 below.*)

NOTE No. 1. When selecting a set of Lovibond Standard Color Glasses, we are glad to give any assistance necessary to obtain the correct selection for the specific kind of work to be done. Often, only a few color glasses are required.

Single Standards; Each, $2.35
Compound Standards; Each, $4.70

NOTE No. 2. All of the Lovibond Standard Color Glasses are not carried in stock and a delay of approximately six weeks is often necessary for importation from England.

7-290. TINTOMETER BOOK, "Measurement of Light and Color Sensations," written by Joseph W. Lovibond, the inventor of the Lovibond Tintometer. This is a book of 132 pages, which discusses thoroughly the measurement of color values by means of the Lovibond Tintometer. **Each, $3.50**

7-295. METAL TROUGHS, Gauged, for Lovibond Tintometer; used to contain liquids under examination in color determinations. The troughs are made of silver-plated metal, accurately gauged, with parallel plate-glass ends. The sizes listed are those most used, but other sizes are obtainable. (*We shall be glad to offer our suggestion as to the size and kind of trough best suited for any specific work.*)

Length, inches	1/16	⅛	¼	½	1	18
Each	**$9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**24.00**

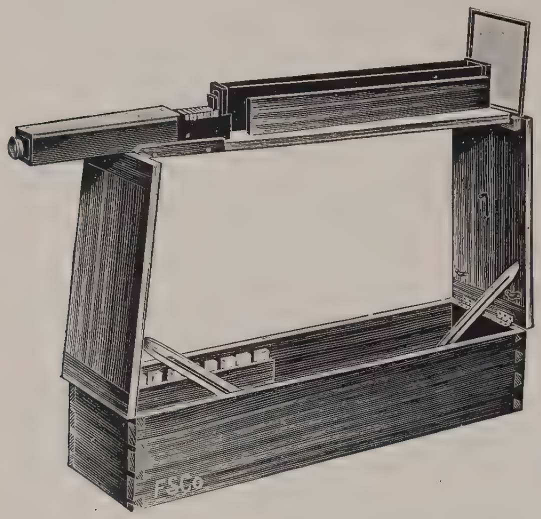
7-300. WHITE REFLECTOR, Mounted, for Lovibond Tintometer. This reflector is made of milk-white, opal glass, ground smooth, mounted on a jointed brass stand. It is used in connection with Tintometer No. 7-280 when examining liquids in troughs more than one (1) inch in length. **Each, $19.00**

7-305. STANDARD WHITE (Powder), for Lovibond Tintometer; used to make a standard white background, against which the Lovibond Standard Color Glasses are viewed. This is usually placed in Powder Tray No. 7-315 after being compressed to one-half of its volume by means of Powder Compressor No. 7-310.
Supplied without Powder Tray or Powder Compressor. **Per 4-ounce bottle, $1.00**

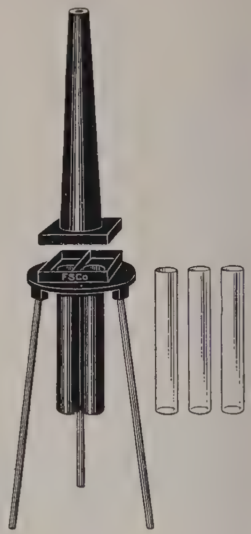
7-310. POWDER COMPRESSOR, for Lovibond Tintometer; used for compressing Standard White No. 7-305, or flours and other powdered materials before examination for colorimetric determinations. The compressor fits into a wooden frame and reduces the volume of powdered materials one-half. **Each, $2.00**

7-315. POWDER TRAY, for Lovibond Tintometer; used to contain Standard White No. 7-305, or flours and other powdered materials under examination for color. **Each, $ .50**

7-320. WOODEN BLOCK, for Lovibond Tintometer; used as a base upon which to wrap yarn or to stretch fabrics, papers and similar substances under examination for color. **Each, $ .50**



7-330



7-350

7-325. COLORIMETER, Lovibond Tintometer Outfit for Flour. This Tintometer is a practical instrument for standardizing the quality of flour by measuring its color. When a standard is once established from a mixture of various wheats, the same quality can be reproduced from year to year as the new wheat comes in. The Tintometer is also used to detect bad milling and over-pressure in grinding new wheats. From the color a fair index of the quality of glutons and starch in flours can be obtained.

The Tintometer can be used either as a monocular or a binocular and is supplied with an adjustable Brass Stand, six Powder Trays, one Powder Compressor, one 4-ounce bottle of Standard White, together with fifty-five (55) Lovibond Standard Color Glasses as follows:

15 Lovibond Color Glasses................................Series No. 200, Red
27 Lovibond Color Glasses................................Series No. 510, Yellow
10 Lovibond Color Glasses................................Series No. 1180, Blue
3 Lovibond Colorless Glasses

Supplied in wooden box, complete as described, with standard color glasses. **Each, $130.00**

7-330. COLORIMETER, Lovibond Tintometer Outfit, for Light-colored Petroleum Products. This Tintometer has been the standard used in petroleum refineries for many years and has proven a simple means by which they have graded gasoline, kerosene, etc. The instrument shows the depth of color in the liquids and this can be accurately measured in degrees, by comparing the unknown with the standards, which are Lovibond Standard Color Glasses.

This Tintometer is monocular and is equipped with one 18-inch, silvered Metal Trough, with parallel plate glass ends. The wooden case which contains the instrument and accessories, when opened, forms the support upon which the Tintometer rests. The observation is made against a special milk-white glass reflector. Four Lovibond Standard Color Glasses are supplied as follows: Water White, Standard White, Superfine White and Prime White. Furnished complete, in wooden case, with standards. **Each, $75.00**

7-335. COLOR STANDARD SET, for Intermediate Oils. This set consists of five Compound Lovibond Standard Color Glasses as follows: N.P.A. Standards, No. 1½, No. 3, No. 4, No. 5, and No. 7. **Per set, $22.50**

7-340. COLOR STANDARD SET, for Cotton Seed Oil. The following 27 Single Lovibond Standard Color Glasses represent a complete set to determine the color of cotton seed oil. These may be obtained either as a complete set or singly, as desired.

Standard Reds					Standard Yellows		
0.1	0.5	0.9	4.0	8.0	1.0	8.0	
0.2	0.6	1.0	5.0	9.0	2.0	10.0	
0.3	0.7	2.0	6.0	10.0	4.0	20.0	**Per set, $60.00**
0.4	0.8	3.0	7.0		6.0	35.0	**Each, $2.35**

7-345. COLOR STANDARD (Prime Summer Yellow), for Cotton Seed Oil. This is a compound color glass made by combining Lovibond Standard Color Glass, Red No 7.1, with Lovibond Standard Color Glass, Yellow No. 35.0. By means of this one compound color standard, cotton seed oils may be classified quickly as to whether they are above or below Prime Summer Yellow.

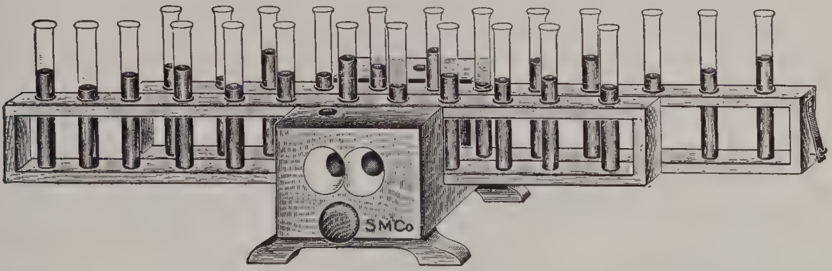
This compound color standard can be used either with the standard Tintometer No. 7-280, or with the Wesson Colorimeter No. 7-350. **Compound Color Standard, Each, $4.70**

7-350. COLORIMETER, Wesson, Metal Column, for Cotton Seed Oil. This colorimeter consists of a metallic observation column, mounted on a tripod. The cotton seed oil samples are measured in glass tubes, 6 inches long, which are arranged so that the centers of the colored fields are only ¾ inch apart. This design permits close readings, and eliminates errors due to the variations in color and thickness of glass in bottles.

Supplied complete with three Oil Sample Tubes, but without Lovibond Standard Color Glasses. (*For color-glasses, see No. 7-340 and No. 7-345.*) **Each, $10.00**

7-355. OIL SAMPLE TUBE, Wesson, for Cotton Seed Oil; made of clear, colorless glass, with polished bottom, 6 inches long and ⅞ inch outside diameter; used with Wesson Colorimeter No. 7-350. **Each, $1.00**
Per dozen, $10.00

HYDROGEN-ION COLOR COMPARATOR



7-360

7-360. COLOR COMPARATOR, Cooledge. For general colorimetric analysis where a series of standards is used, as in the determination of the hydrogen-ion concentration of liquids by means of the Clark and Lubs Indicators Nos. 5-975 to 5-998.

The method is based upon the fact that the color of the indicators used, varies with the hydrogen-ion concentration of the solution. In making the determination, a series of color standards of known hydrogen-ion concentration is made up, and the color of the unknown liquid compared with that of each of the known liquids until a match is obtained. The two solutions then have the same hydrogen-ion concentration. For details, *see Journal of Biochemistry V, 207 (1910)*, and *Journal of Biological Chemistry II, Nos. 1–3 (1917)*. The Comparator can be used in a similar manner for other tests.

The apparatus consists of a hard wood block with two parallel sight holes extending completely through it, with an opening into which two test tube racks are fitted. Each rack accommodates twelve tubes up to ⅞ of an inch outside diameter. The rear rack is used for the standards, while the front rack is used for the unknown liquids.

By means of the cord at the front of the comparator, the rear rack may be quickly shifted so that any one of the standards may be brought into the line of sight. A wooden knob at the front of the comparator moves the front rack, bringing the various unknown liquids into view. Both racks are fitted with a device which centers each tube when the rack is shifted.

Where there is a secondary color reaction between the unknown liquids and the indicator, it can be detected in this colorimeter. To do this, place the unknown without indicator in the separate opening in line with the standard, then place distilled water in the other separate opening in line with the unknown, which has indicator added. If the colors cannot be matched, there has been a secondary color reaction in the unknown liquid.

Cooledge Color Comparator, as described, but without glass tubes or indicators. **Each, $16.50**

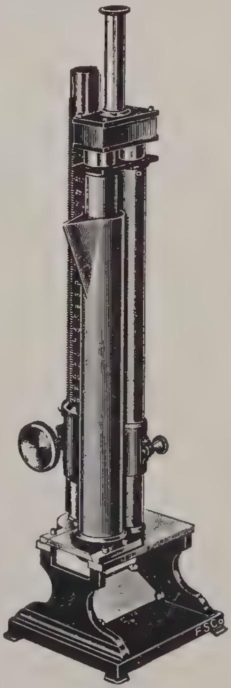
TUBES, for Colorimeter, No. 7-360 see Test Tubes; ⅝ inch diameter test tubes are usually employed.

HYDROGEN-ION INDICATORS, for Colorimeter No. 7-360, see Nos. 5-975 to 5-998.

7-365. COLORIMETER, Stammer. For measuring the degree of color of sugar solutions, oils, shellacs, varnishes, paint vehicles, and filter press runnings. This is a convenient apparatus for estimating the decolorizing power of boneblack, silica gel, absorbent paper, etc., when used as clarifying agents. It is used in the edible oil and sugar industries for classifying filtrates. It measures the degree of color, not the quality of the color producing substances. It operates on the plunger principle, matching the color of a solution with one of four standard color glasses, by varying the depth of liquid under observation.

A solution of one (1) mm. depth which matches a standard glass, has a value of 100. The color value is therefore equal to the scale reading (mm.) divided into 100. The tube and plungers are 260 mm. high.

Supplied with a set of four standard color glasses. **Each, $190.00**

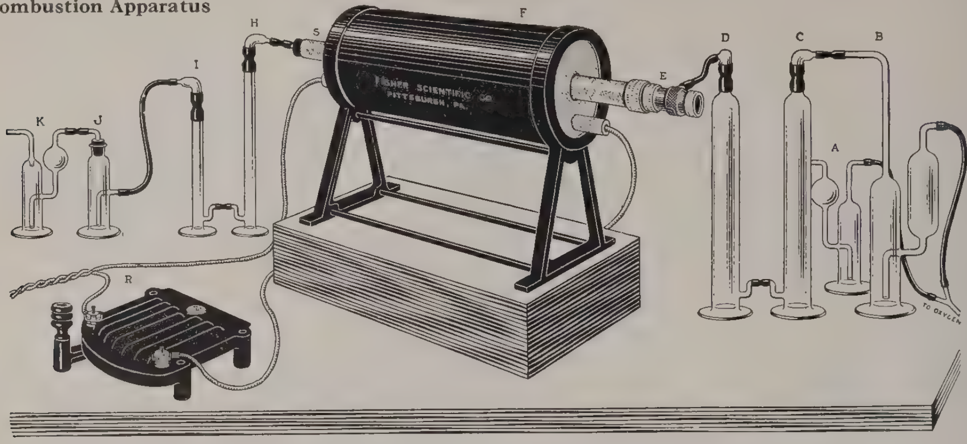


7-365

COLORIMETERS, for specific diagnostic tests, see Haemaglobinometers Nos. 6-255 to 6-315, also Clinical Colorimeters Nos. 6-320 to 6-345.

COLORIMETERS, for oil testing, see also Petroleum Testing Apparatus.

Combustion Apparatus



7-370

7-370. COMBUSTION TRAIN, Johnson. The train illustrated and described is the original Johnson Train brought up-to-date. The train and the method are both described by C. M. Johnson of Pittsburgh in *Chemical Analysis of Steel, Steel-Making Alloys and Graphite*, listed under No. 7-400. Some laboratories use the train exactly as illustrated, but we can supply this train with any modifications desired.

The Train consists of:
- Pressure Gauge, "A"
- Safety Jar, "B"
- Drying Jars, "C" and "D"
- Breech Connector, "E"
- Silica Tube, "S," 30x⅞ inches inside
- Furnace, "F"
- Rheostat, "R"
- Zinc Jar, "H"
- P_2O_5 Jar, "I"
- CO_2 Absorption Bulb, "J"
- Guard Bulb, "K"

Supplied with all the parts mentioned, together with rubber stoppers and Scimatco rubber tubing connections which cling to the glass and prevent leaks. *In ordering state voltage of electric current.*

Train with furnace and rheostat, without oxygen, **$70.00**

7-525. MERCURY PRESSURE GAUGE, (Part A). To detect stoppages in the train. This is a glass jar to be filled to a depth of two inches with mercury. The oxygen does not pass through this jar; it is connected to the line of the other apparatus by a glass Y tube. A stoppage in the train causes the mercury to rise in the tube in the jar, and the bulb acts as a trap. Supplied without mercury. **Each, $2.00**

7-375. SAFETY JAR, (Part B). To be charged with potassium hydroxide solution; to absorb any CO_2 in the oxygen. The large expansion bulb traps the solution in case of back pressure, and prevents it from flowing back. **Each, $2.75**

7-380. DRYING JARS, (Parts C and D). Jar "C" is used for stick potassium hydroxide or for any solid drier or absorbent. Jar "D" is used with granular calcium chloride to remove moisture from the oxygen stream. **Each, $2.00**

7-580. BREECH CONNECTOR, Fisher, (Part E). Used to quickly insert and withdraw the boats from the tubes without disturbing any connections, also for observing the combustions. Illustrated and described separately on page 251. **Each, $15.00**

7-385. COMBUSTION TUBE, Silica, (Part S). Length, 30 inches; inside diameter, ⅞ inch. These tubes are especially selected for this purpose; the ends are round and are fused to prevent cutting the stoppers. The diameter permits the use of larger boats which can be protected with No. 7-690 Boat Lining. See also description under Silica Combustion Tubes on page 252. **Each, $7.75**

7-465. COMBUSTION FURNACE, Hoskins, (Part F). This furnace is illustrated and described separately under this same number on page 247. For 110 volts, or for 220 volts (*state which*). **Each, $25.00**

7-480. RHEOSTAT, for No. 7-465 Furnace, (Part R). This is used to control the temperature; it is illustrated and described separately under this same number on page 247. For 110 volts, or for 220 volts (*state which*). **Each, $10.00**

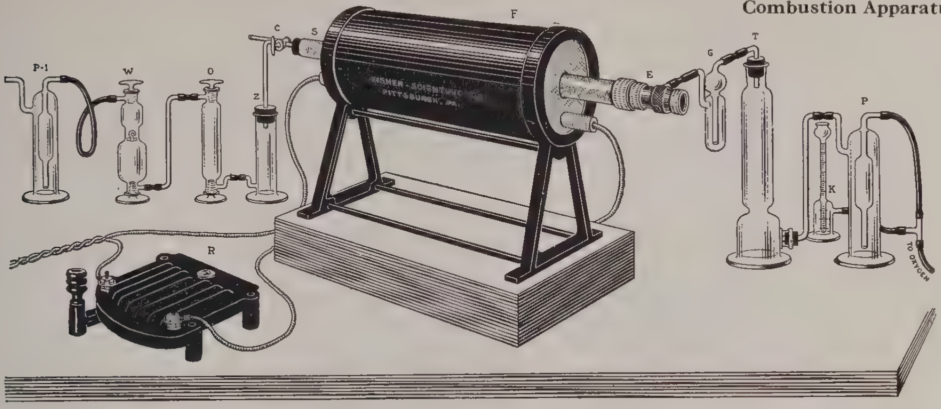
7-390. ZINC JAR, (Part H). To be charged with granulated zinc, to remove acid fumes, litharge fumes, sulphur fumes, and chlorine fumes. **Each, $1.40**

7-395. PHOSPHORIC ANHYDRIDE JAR, (Part I). For Dehydreen or P_2O_5, to remove moisture. **Each, $1.30**

7-530. ABSORPTION BULB, (CO_2), Johnson, for Dry Absorbents, (Part J). A modified Stetser-Norton Bulb, for the absorption of CO_2. This bulb is made with a molded glass base which makes it more stable and withstands the handling necessary in weighing, cleaning and refilling. It is usually charged with No. 7-570 Ascarite. It is illustrated and described separately under this same number on page 250. **Each, $2.50**

7-525. GUARD BULB, (Part K). Bubble tube for potassium hydroxide solution and used as a guard to prevent CO_2 from getting into the Absorption Bulb (J) via the outlet at the top. It is not weighed with the Absorption Bulb. **Each, $2.00**

7-400. BOOK, "Chemical Analysis of Steel. Steel-Making Alloys and Graphites," by C. M. Johnson. Third edition, 550 pages. **Each, $6.00**



7-405

7-405. FLEMING COMBUSTION TRAIN. This is a complete combustion apparatus that we supply quite frequently exactly as illustrated and described. It can also be supplied with any modifications desired.

The glass parts listed were originally designed by Wm. R. Fleming, Andrews Steel Company, and described in *Iron Age, January, 1914.* **The Train consists of:**

Mercury Pressure Gauge, "K"
Washing Bottles, "P" and "P-1"
Calcium Chloride Jar, "T"
Mercury Check-Valve, "G"
Breech Connector, "E"
Silica Combustion Tube, "S," 30x⅞ inches inside
Hoskins Combustion Furnace, "F"
Rheostat, "R"
Glass Stopcock, "C"
Zinc Jar, "Z"
Phosphoric Anhydride Jar, "O"
Fleming Absorption Bulb, "W"

Supplied with all the parts mentioned, together with rubber stoppers and Scimatco rubber tubing connections which cling to the glass and prevent leaks. *In ordering state voltage of electric current.*

Train with furnace and rheostat, without oxygen, **$73.00**

7-410. MERCURY PRESSURE GAUGE, (Part K). For indicating the oxygen pressure in the train and serving as a safety valve, relieving any excess pressure should the system become choked or the pressure regulating valve on the oxygen tank fail to work properly. Gauge is calibrated to indicate pressures up to 6 inches, graduated in ⅛-inch divisions. **Each, $2.50**

7-415. WASHING BOTTLES, (Parts P and P-1). To be charged with potassium hydroxide, for absorbing any carbon dioxide from the oxygen, and for indicating the flow of gases through the purification end of the train. This bottle (P-1) is also used at the end of the train to indicate the flow of gases at that point, and to prevent any moisture from getting into the absorption bulb by way of the exit tube. **Each, $2.00**

7-420. CALCIUM CHLORIDE JAR, (Part T). This is an absorption tower 250 mm. high, to be filled with granular calcium chloride for absorbing any moisture taken up by the oxygen in passing through the caustic solution. The lower compartment serves as a drain pit to catch any moisture dripping from the chloride. Dehydreen, described on page 631, can also be used. **Each, $1.50**

7-425. MERCURY CHECK-VALVE, (Part G). Used to seal off the purifying train from the air, when the combustion tube is opened for charging; this keeps the purifying train full of pure oxygen. **Each, $ .95**

7-580. BREECH CONNECTOR, Fisher, (Part E). Used to quickly insert and withdraw the boats from the tubes without disturbing any connections, also for observing the combustions. Illustrated and described separately on page 251. **Each, $15.00**

7-385. COMBUSTION TUBE, Silica, (Part S). Length, 30 inches; inside diameter, ⅞ inch. These tubes are especially selected for this purpose; the ends are round and are fused to prevent cutting the stoppers. The diameter permits the use of larger boats which can be protected with Boat Lining No. 7-690. See also description under Silica Combustion Tubes on page 252. **Each, $7.75**

7-465. COMBUSTION FURNACE, Hoskins, (Part F). This furnace is illustrated and described separately under this same number on page 247. For 110 volts, or for 220 volts (*state which*). **Each, $25.00**

7-480. RHEOSTAT, for Furnace No. 7-465, (Part R). This is used to control the temperature; it is illustrated and described separately under this same number on page 247. For 110 volts, or for 220 volts (*state which*). **Each, $10.00**

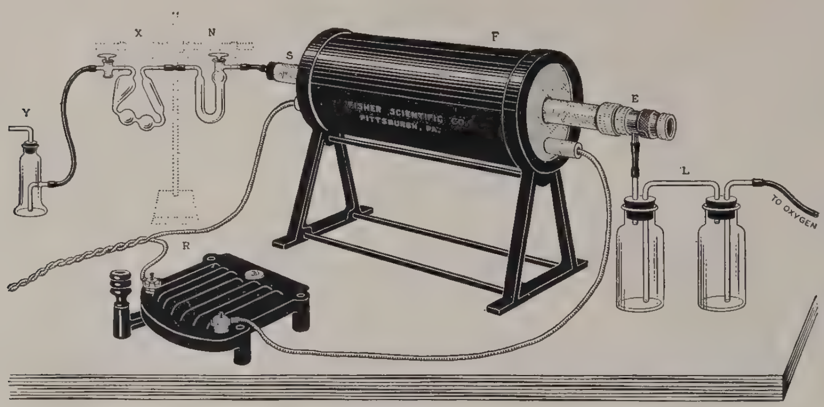
7-430. STOPCOCK, (Part C). This is a special three-way glass stopcock, by means of which the gases swept from the tube can be by-passed to the open air. Another setting of the stopcock connects the tube with the absorption train. **Each, $2.25**

7-435. ZINC JAR, (Part Z). To be filled with zinc for removing sulphur fumes, litharge, etc., carried over by the gases. **Each, $1.00**

7-440. PHOSPHORIC ANHYDRIDE JAR, (Part O) For Dehydreen or P_2O_5, for the removal of moisture from the gases. This jar has two ground glass stoppers. The stopper at the top has an opening to the outlet tube; by turning this stopper the outlet is closed. The stopper at the bottom has an opening to the inlet tube; by turning this stopper the inlet is closed. **Each, $2.50**

7-540. ABSORPTION BULB, (CO_2), Fleming, (Part W). For the absorption of the carbon dioxide formed in the combustion. This bulb is made in one piece and has two compartments. The lower one is usually filled with alternate layers of different mesh soda lime or similar absorbent, while the upper one is charged with Dehydreen or P_2O_5. Connecting the two is a short gooseneck tube which dips into any liquid phosphorus pentoxide and forms a seal. By turning the ground glass stopper at the top, the outlet is sealed. By turning the glass stopper at the bottom, the inlet is sealed.

This bulb is illustrated separately under this same number on page 250. **Each, $5.00**



7-445

7-445. STETSER-NORTON COMBUSTION TRAIN. This is another train that is often used exactly as illustrated, but we can also supply it with any modifications desired.

A Vanier Train *can be set up as follows: For the Purifying end, use Pressure Gauge No. 7-410, Calcium Chloride Jar No. 7-420, andheck-Valve No. 7-425. On the absorption end, replace CO_2 Absorption Bulb "Y" by Vanier Bulb No. 7-535.*

The glass parts illustrated are arranged as used by J. B. Stetser and R. H. Norton, and is described in *Iron Age, August 22, 1918.* Two large bottles are sometimes used to hold the oxygen and supply it to the train at a reduced and constant pressure; a Constant Pressure Regulator (see Gases) will serve this purpose. **The Train consists of:**

2 Gas Purifying Bottles, "L"
Breech Connector, "E"
Silica Tube, "S," 30x⅞ inches inside
Furnace, "F"
Rheostat, "R"
Zinc Tube, "N"
Sulphuric Acid Bulb, "X"
Absorption (CO_2) Bulb, "Y"

Supplied with all the parts mentioned, together with rubber stoppers and Scimatco rubber tubing connections which cling to the glass and prevent leaks. *In ordering state voltage of electric current.*

Train with furnace and rheostat, without oxygen, **$62.00**

7-450. GAS PURIFYING BOTTLES, (Part L). These are 8 oz. bottles with 2-hole rubber stoppers and glass tubes. Two of these bottles are used; the first one is charged with concentrated sulphuric acid to remove moisture; the second one can be charged with Ascarite or Wilson Soda Lime to remove CO_2 and acid vapor. **Each, $ .50**

7-580. BREECH CONNECTOR, Fisher, (Part E). Used to quickly insert and withdraw the boats from the tubes without disturbing any connections, also for observing the combustions. Illustrated and described separately on page 251. **Each, $15.00**

7-385. COMBUSTION TUBE, Silica, (Part S). Length, 30 inches; inside diameter, ⅞ inch. These tubes are especially selected for this purpose; the ends are round and are fused to prevent cutting the stoppers. The diameter permits the use of larger boats which can be protected with Boat Lining No. 7-690. See also description under Silica Combustion Tubes on page 252. **Each, $7.75**

7-465. COMBUSTION FURNACE, Hoskins, (Part F). This furnace is illustrated and described separately under this same number on page 247. For 110 volts, or for 220 volts (*state which*). **Each, $25.00**

7-480. RHEOSTAT, for Furnace No. 7-465, (Part R). This is used to control the temperature; it is illustrated and described separately under this same number on page 247. For 110 volts, or for 220 volts (*state which*). **Each, $10.00**

7-455. ZINC TUBE, Vanier, (Part N). Glass U tube, 120 mm. high to the top of the neck. Provided with ground glass stopper which has an opening to the inlet tube; by turning the stopper the inlet is closed, and this stopcock together with the stopcock on Part "X," seal these two pieces as a unit.

This tube is to be charged with granular zinc for removing fumes from the gases. **Each, $1.00**

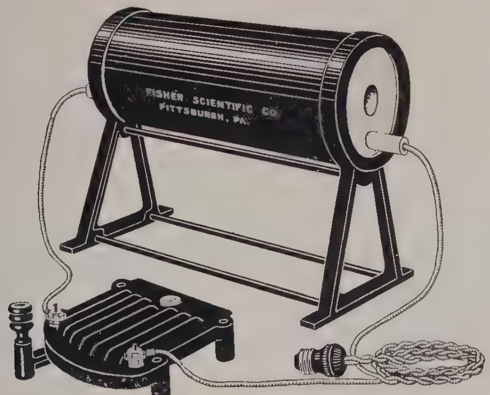
7-460. SULPHURIC ACID BULB, Vanier, (Part X). With inclined absorption tube which has expansion chambers which decreases the vapor speed through the bulb and increases the absorption area.

The outlet has a glass stopcock so that this bulb and the zinc tube can be sealed as a unit. This saves time by eliminating the necessity of sweeping out air, moisture, etc., which would otherwise accumulate when the apparatus was not in actual use. **Each, $2.25**

7-560. ABSORPTION BULB, (CO_2), Stetser-Norton, Modified Midvale Bulb, (Part Y). A simple form absorption bulb, 45 mm. base, 32 mm. body, height over all about 125 mm.; for use with Ascarite Absorbent No. 7-570. This is the same design as the first Midvale Bulb, but it has a larger capacity. It is illustrated and described separately under this same number on page 251. The use of Dehydreen with Ascarite is recommended. Supplied with rubber stopper and capillary outlet tube. **Each, $2.00**

A Milligan Bulb charged with barium hydroxide and placed at the end of the train indicates when the bulb is spent. See No. 7-510.

HOSKINS
COMBUSTION FURNACES
FOR
CARBON DETERMINATIONS



7-480 7-465

Complete Heating Unit
wound on alundum core.

7-470 7-475

7-465. COMBUSTION FURNACE, Hoskins. This is the usual type of furnace with the coiled heating unit, and is "Part F" in the combustion trains illustrated on the previous pages. The opening of this particular furnace is large enough to take a silica tube one (1) inch inside diameter. The Hoskins Combustion Furnaces have given the longest service for carbon combustions, because of the pure **Chromel "A"** heating **element.** This is the original Nichrome alloy patented by The Hoskins Co.; it is 80% nickel and 20% chromium and is practically iron-free.

Another feature is the ease with which the heating unit can be replaced by the operator.

The heating chamber is an alundum refractory, 12 inches long and 1⅜ inches inside diameter, around which are grooves to take the chromel heating unit. This method of construction insures even heating throughout the entire length and circumference of the heating chamber. The safe working temperature of this furnace is 1000° C.; Rheostat No. 7-480 must be used to prevent overheating.

Furnace for 110-volt current, or for 220-volt current. (*State voltage when ordering.*) **Each, $25.00**

7-470. HEATING UNIT, for Furnace No. 7-465, made of pure **Chromel "A."** To replace the unit, remove the alundum core of the furnace and the old unit, and place this one in the grooves provided. The unit is coiled like a spring, ready to be wound on the refractory; one or more of these units should be kept on hand. For 110 volts, or for 220 volts (*state which*). **Each, $2.25**

7-475. REFRACTORY, Alundum Core, for Furnace No. 7-465. With corrugations on the outside for taking the heating unit. One of these spare refractories should be kept on hand; it can be wound with the heating unit for quick replacement in case the unit burns out or in case of an accident to the refractory itself. **Each, $4.00**

7-480. RHEOSTAT, for Furnace No. 7-465. This rheostat must be used to control the temperature of the furnace. The furnace must have extra capacity in order to heat it from cold to the desired temperature in a reasonable time. After it reaches the safe operating temperature of 1000° C., some resistance of this rheostat must be thrown into the circuit. The life of a heating unit is a matter of temperature and time, not time alone. Overheating, for even a short time, takes more life out of a unit than a long run within the safe working temperature.

Supplied under this number for 110 volts, also for 220 volts. (*State voltage when ordering.*) **Each, $10.00**

REGARDING COMBUSTION APPARATUS
FOR THE DETERMINATION OF CARBON IN STEEL

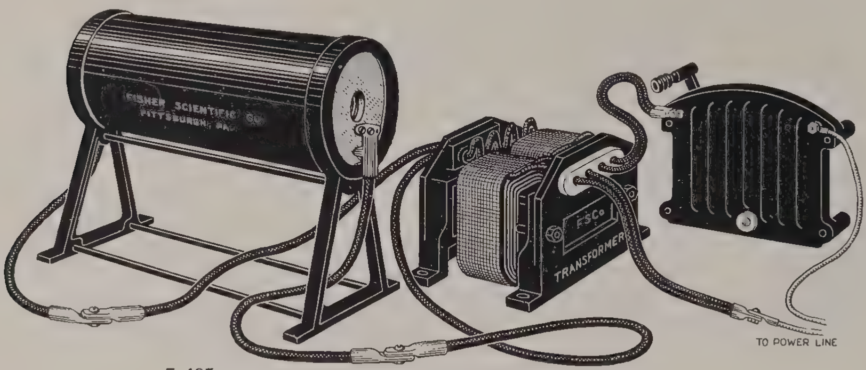
There have been no material changes in Carbon Combustion Apparatus since the first train using base-metal resistance which we built and offered in 1908. The improvements have made the operations simpler and more convenient.

The tendency today is to use dry absorbents in the CO_2 bulbs, to use larger samples, larger boats and larger tubes, and to simplify the manipulations.

Many chemists have preferences for certain glass parts or arrangements of them, and some desire minor changes, all of which we take care of in our own Glass Blowing Shop. To list all of the combustion apparatus that we make, would confuse the selection and present an elaboration of combustion trains, whereas the tendency in the foremost steel laboratories is to simplify these trains.

From all this, we have selected the Johnson Train, the Fleming Train and the Stetser-Norton Train which is readily modified to form a Vanier Train. In addition, we have listed a wide selection of Absorption (CO_2) Bulbs, Gas Washing Bottles, Combustion Boats, Tubes, and Connectors.

Any of the Trains as listed, or with the modifications suggested, will meet the requirements. On account of the diversity of apparatus by which correct results can be obtained, the A.S.T.M. Standard Methods for 1924 do not prescribe definitely what shall be used.



7-485 7-490 7-495

7-500

7-485. COMBUSTION FURNACE, Hoskins, Heavy Duty. This is a special furnace that we have supplied to many Iron and Steel Laboratories that operate twenty-four hours each day, under which conditions it has proven the most satisfactory.

The feature of this furnace is the heavy heating unit which better withstands the inevitable oxidation and gives it a longer life; it also increases the safe working temperature to 1100° C.

To employ this heavy unit, a low voltage is necessary, and this furnace operates on 15 volts. To reduce the usual current to 15 volts, we supply Transformer No. 7-490, but the **current must be alternating.** So great a reduction with direct current is not economical.

The furnace is 12 inches long and the opening for the combustion tube is 1⅜ inches. There is no alundum refractory tube inside this furnace as is the case with Furnace No. 7-465, therefore the silica combustion tube is directly exposed to the heat of the unit. The heavy heating unit is pure **Chromel "A,"** which is 80% nickel and 20% chromium and is practically iron-free.

We supply different transformers for use on the following alternating currents: 110-volt, 25-cycle; 110-volt, 60 cycle; 220-volt, 25-cycle; 220-volt, 60-cycle. (110-volt, 60-cycle is the usual current supplied by Public Service Corporations.) Rheostat No. 7-495 must be used to control the temperature of the furnace to prevent overheating. Supplied without transformer or rheostat. **Each, $25.00**

This type furnace can also be supplied to take five combustion tubes. Description and price will be furnished on request.

7-490. TRANSFORMER, for Furnace No. 7-485. This transformer reduces the voltage of the usual alternating currents, to that required by the furnace (15 volts).

Four different transformers are supplied under this number; for 110 volts, 60 cycles; for 110 volts, 25 cycles; for 220 volts, 60 cycles; for 220 volts, 25 cycles. (Transformers for currents other than these, will be quoted on request.) **For 60-cycle current** (*state voltage*), **$30.00**

In ordering, state voltage and the number of cycles. **For 25-cycle current** (*state voltage*), **$42.00**

7-495. RHEOSTAT, for Furnace No. 7-485. This rheostat is placed in the primary circuit (between the line and the transformer). It is used to control the temperature of the furnace, and after the furnace has come up to temperature, some resistance of this rheostat must be thrown in. The life of the heating unit is a matter of temperature and time, not time alone. Overheating, for even a short time, takes more life out of a unit than a long run within the safe working temperature.

Supplied for 110-volt currents, also for 220-volt currents. (*State voltage when ordering.*) **Each, $11.50**

7-500. HEATING UNIT, Heavy Duty, for Furnace No. 7-485. A helical coil of heavy **Chromel "A,"** which is 80% nickel and 20% chromium and is practically iron-free. **Each, $3.75**

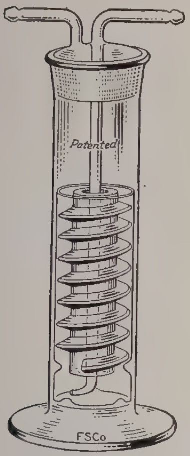
COMBUSTION FURNACES, for Organic Combustions, see Furnaces.

TO PROLONG THE LIFE OF A HEATING UNIT

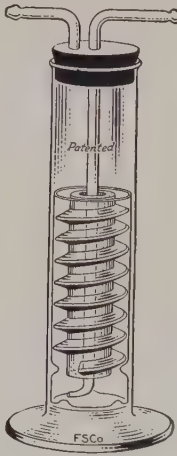
The life of a heating unit is a matter of temperature and time, not time alone. Over-heating, for even a short time, takes more life out of a unit than a long run within the safe working temperature.

These furnaces are designed to come up to temperature in a reasonable time, and when the safe operating temperature is reached, resistance from the rheostat must be thrown into the circuit to prevent over-heating. Fluctuations in line voltages, unless compensated for, frequently cause over-heating. Although Chromel "A" is the best base-metal alloy for resisting oxidation at high temperatures, oxidation does take place very slowly within the safe operating temperature but quite rapidly above this temperature.

In replacing a heating unit, examine the refractory for spots which might have been fluxed by the old unit. Chip out such spots to prevent their fluxing the new unit.



7-505



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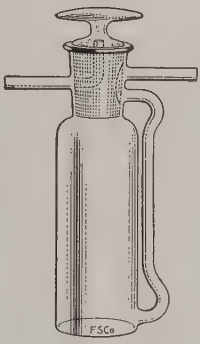
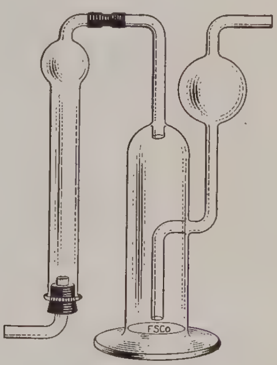


7-515



7-520
See also No. 7-525

7-505. GAS ABSORBING BOTTLE, Milligan, Glass Stoppered (*Patented Feb., 1925*); designed by Lowell H. Milligan. The jar part is 9 inches high and has the absorbing capacity of a bottle 43 inches high.

This is a most efficient piece of apparatus to use in a carbon combustion train, in both the purifying end and the absorption end. It can be charged with potassium hydroxide solution for removing CO_2 from the oxygen or it can be charged with sulphuric acid for removing water vapors. It can be used in place of any of the jars or bulbs using a liquid absorbent, in the combustion trains described.

Features. The jar part is 9 inches high, but its absorbing power is equivalent to that of a jar 43 inches high. The gas bubbles travel around the spiral glass core eight times before reaching the top of the liquid and then pass through a three-inch settling chamber at the top where any liquid mechanically entrained settles out. Both ends of the spiral core are open and the rising bubbles produce circulation of the absorbing liquid. **Each, $5.00**

7-510. GAS ABSORBING BOTTLE, Milligan, Rubber Stoppered (*Patented Feb., 1925*). This bottle has the same spiral core as No. 7-505, and has the same five to one efficiency. It has a rubber stopper and separate tubes instead of the one-piece glass stopper. **Each, $3.50**

We suggest this jar be charged with barium hydroxide and connected to the outlet of the CO_2 bulb at the rear of the train. In this way, it serves three purposes: it prevents CO_2 or moisture from entering the weighing bulb by way of the exit; it indicates the flow of gas at this end of the train and it indicates when the CO_2 bulb is spent and should be refilled. Just as soon as any CO_2 is passed by the absorbing bulb, a precipitate of barium carbonate will be observed in the barium hydroxide solution. It can also be used in other places in trains where a liquid absorbent is used.

For other Gas Absorbing Bottles, see Trains Nos. 7-370, 7-405 and 7-445.

7-515. ABSORPTION BULB, (CO_2), Nesbitt; designed by C. E. Nesbitt, Chief Chemist, Carnegie Steel Company, Edgar Thompson Works. This is one of the most efficient and most used bulbs for carbon determinations.

It has but one stopper, but this serves three purposes; it seals the wide opening to the absorbent chamber; it opens and seals the inlet and it opens and seals the outlet. One position of this stopper opens all passages for the flow of the gases through the bulb, and a quarter turn of the stopper completely seals it for weighing.

Directions for Filling. Place a half-inch layer of glass wool in the bottom, fill with Ascarite to three-fourths of an inch from the shoulder, insert a one-fourth inch layer of asbestos, then add one-half inch of calcium chloride and a layer of glass wool to reach the neck. Place cotton in the hollow glass stopper. When charged in this manner, 500 carbon determinations with a 1.36 gram sample can be made with one (1) filling or 250 determinations with a 2.72 gram sample. **Each, $4.50**

NOTE. We do not recommend the modification of the Nesbitt bulb with the lower tube extending into the center. Mr. Nesbitt's first model of this bulb was made in this manner, but tests showed that the gas channeled up through the absorbent and made frequent recharging necessary. The inlet tube was an inconvenience and liable to break in cleaning. The substitution of a layer of glass wool for the inlet tube distributed the gas, and many more determinations were made with one filling.

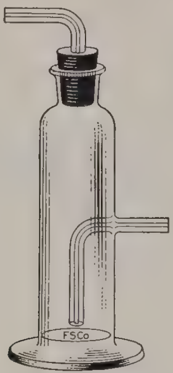
7-520. ABSORPTION BULB, (CO_2), Johnson, for Liquid Absorbent. This is the original form designed by C. M. Johnson for potassium hydroxide solution. It is used with the drying tube attached, as illustrated, for absorbing and weighing the CO_2 from the combustion. It is also used without the drying tube (No. 7-525) in other parts of trains.

It has a wide substantial base and an expansion bulb on the inlet to trap the liquid if back pressure should occur. The outlet tube extends one-fourth of an inch into the bulb to trap moisture from the walls **With drying tube, Each, $2.25**

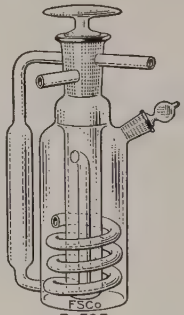
7-525. ABSORPTION BULB, Johnson, without drying tube. This is the No. 7-520 Bulb but without the calcium chloride tube.

It is used as a mercury pressure gauge or as an absorption bulb in the purifying part of the train, also as an absorption bulb or as a guard behind another CO_2 absorption bulb on the absorbing end of the train. **Without drying tube, Each, $2.00**

Combustion Apparatus



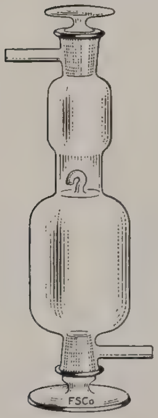
7-530



7-535

7-530. ABSORPTION BULB, (CO_2), Johnson, for Dry Absorbents. This is a modified Stetser-Norton Bulb used by C. M. Johnson. It is about five and one-half inches high to the neck and has a molded glass base which makes it more stable and better withstands the handling and cleaning. It is to be charged with Ascarite No. 7-570. **Each, $2.50**

7-535. ABSORPTION BULB, (CO_2), Vanier, for Liquid Absorbent. Designed by G. P. Vanier, Chief Chemist, Steelton Plant, Bethlehem Steel Company. A combined absorption bulb and drying tube. This bulb consists of two concentric cylinders, the inner one being filled with solid drying material while the outer is filled with liquid absorbent. The gas from the combustion tube enters through the tube at the stopper, passes through and down the outside tube and enters a spiral tube (wrapped around the outside of the inner tube), at a point an inch from its lower end. As the gas rises it propels the absorbent before it and draws in fresh absorbent after it, thereby effecting circulation of the liquid. The inner cylinder is open to the outer cylinder through a tube extending through its side, down to its bottom. The gas passes through this and then through the absorbent in this drying tube, and thence to the atmosphere through the third branch from the stopper. A slight turn of the stopcock seals the entire bulb. **Each, $6.00**



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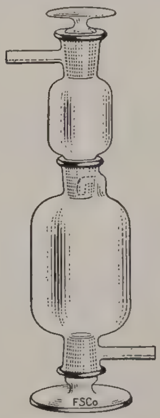
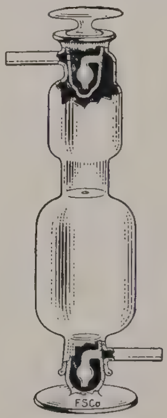
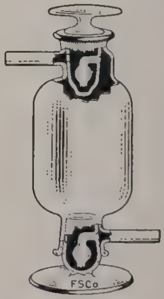


7-545



7-550



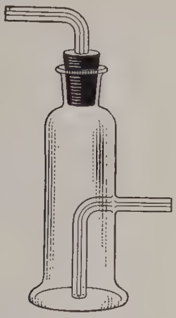
7-555

7-540. ABSORPTION BULB, (CO_2), Fleming, One-Piece. This bulb is made in one piece and has two compartments connected by a gooseneck, dip tube. The lower chamber is usually filled with alternate layers of different mesh (20-40-60) soda lime, Ascarite or similar absorbent, while the upper one is charged with phosphoric anhydride. As the P_2O_5 liquefies, it collects in the bottom of the upper compartment and forms a seal. The glass stoppers have openings to the connecting tubes; by turning these stoppers the bulb is sealed for weighing. The hollow portions of the stoppers may be filled with glass wool, asbestos, or cotton to prevent any material from plugging the tubes. **Each, $5.00**

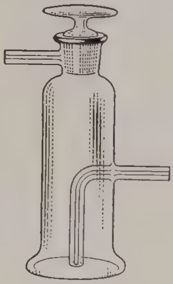
7-545. ABSORPTION BULB, (CO_2), Fleming-Martin, Two-Piece. This bulb is filled and used in the same manner as No. 7-540, but each chamber is a separate piece. These two are connected by a ground glass joint; the gas enters the trap in the upper chamber through an opening in the ground glass joint. **Each, $6.00**

7-550. ABSORPTION BULB, (CO_2), Fleming, Mercury Sealed, Two Compartment. This bulb is filled and used in the same manner as No. 7-540, but it has mercury traps at the openings.
The traps act as check-valves and seal the bulb for weighing. **Each, $7.50**

7-555. ABSORPTION BULB, (CO_2), Fleming, Mercury Sealed, One Compartment. Designed to use Ascarite No. 7-570. **Each, $7.50**



7-560



7-565

7-570

7-560. ABSORPTION BULB, (CO_2), **Stetser-Norton,** Modified Midvale Bulb. A simple form absorption bulb; 45 mm. base, 32 mm. body, height over all about 125 mm. This is the same design as the first Midvale Bulb, but the capacity is larger. Ascarite No. 7-570 is usually used as the absorbent in this bulb. It is supplied with rubber stopper and capillary outlet tube. **Each, $2.00**

ABSORPTION BULB, similar to No. 7-560, but with molded glass base. See No. 7-530.

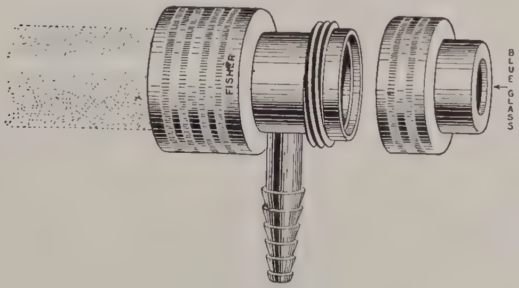
7-565. ABSORPTION BULB, (CO_2), **Stetser-Norton, Glass Stoppered.** This bulb is similar to No. 7-560 but it has a glass stopper in the top which has an opening to the outlet tube. This eliminates the rubber stopper and permits the outlet tube to be sealed. **Each, $3.00**

7-570. ASCARITE. A sodium hydroxide-asbestos absorbent mixture used for absorbing CO_2 in carbon combustions. Ascarite can be used in any of the absorption bulbs designed for a dry absorbent. **Per lb., $4.50**

Wilson Soda Lime (Absorbent), see page 313.

FISHER BREECH CONNECTOR

(*Another Fisher Product*)



7-580

7-580. FISHER BREECH CONNECTOR (improved type) for combustion tubes. Simplifies the operations in making carbon determinations.

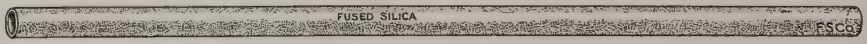
The connector is precisely made from block brass (not cast) and consists of two parts. The body is attached to the combustion tube by Plaster of Paris mixed with 2% acetic acid. The breech block connects to the body by a threaded joint; it has a blue glass window in the rear to permit observation of the combustion without disturbing any connections.

A few turns of the breech block opens or seals the tube, and combustion boats can be inserted or withdrawn without removing any connections. This is a convenience which saves time and eliminates many operations. It also eliminates the use of a rubber stopper.

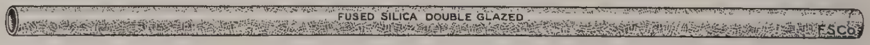
When Fisher Breech Connectors are placed at both ends of the tube, all stoppers are eliminated; the tube can be charged from either end and the gases swept out without disturbing any connections.

The connector is designed to be used on silica tubes having inside diameters from ¾ inch to 1 inch. The adapter of the connector has an inside diameter of 1⅜ inch and can be attached to any combustion tube having a smaller outside diameter. **Each, $15.00**

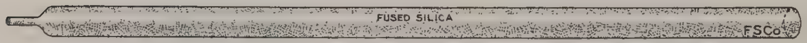
COMBUSTION TUBES



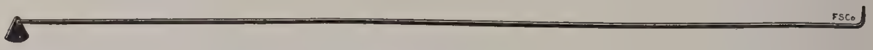
7-590
See also No. 7-595



7-600



7-605



7-610

REGARDING SILICA TUBES

Silica has a low coefficient of expansion, a high softening point, is impervious to gases and is the most satisfactory material available for the severe temperature conditions encountered in carbon combustions. Yet the commercial preparation of the material and methods of production are such that tubes cannot be made with the homogeneity and uniformity that we are accustomed to require of metals.

The life of a tube cannot be predetermined and two tubes from the same lot may not give the same length of service, and for this reason we cannot guarantee the length of the life of a silica tube.

It is suggested that, whenever possible, the tube and the furnace be heated and cooled together as this will lessen the expansion and contraction strains. Also, precautions should be taken to lessen the fusing of hot iron oxide on the inner wall of the tube as this is a frequent cause of failure of silica tubes. See suggestion under No. 7-590, No. 7-685 and No. 7-690.

7-590. COMBUSTION TUBES, Silica, glazed inside, smooth (not glazed) outside. Silica tubes can not be made absolutely true and uniform in shape but we have established tolerances and each of these tubes is selected to come within these tolerances so that it will fit in the furnace and pass the boats. The ends are round so that they can be stoppered tightly and are fused so that they will not cut the stoppers.

The 30x⅞-inch size is the one most used for carbon combustions. We recommend 30-inch tubes with large inside diameter (⅞ or 1-inch), because there will be more clearance above the top of the boat. Therefore, the wall of the tube will receive less spattering from the sample during the combustion. The ends of the 30-inch tubes do not get as hot as those of the 24-inch tubes. A silica tube with a Fisher Breech Connector No. 7-580 makes the most satisfactory and convenient combination.

Length, inches	24	24	24	30	30	30
Diameter, inside, inches	¾	⅞	1	¾	⅞	1
Each	**$5.60**	**6.20**	**6.70**	**7.00**	**7.75**	**8.38**

7-595. COMBUSTION TUBES, Vitreosil. A grade of fused silica sold under the trade name of "Vitreosil." **Glazed inside** with a sanded surface on the outside; the ends are fused.

Length, inches	24	24	24	30	30	30
Diameter, inside, inches	¾	⅞	1	¾	⅞	1
Each	**$5.60**	**6.20**	**6.70**	**7.00**	**7.75**	**8.38**

7-600. COMBUSTION TUBE, Silica. Glazed inside and outside. Length, 30 inches; diameter, inside, ⅞ inch. This is the size tube most used for carbon combustions. **Each, $9.38**

Other sizes of double glazed tubes can be supplied to order.

7-605. COMBUSTION TUBE, Silica, with reduced end. Glazed inside with unglazed surface on the outside. Similar to No. 7-590 but with one end reduced for a length of one (1) inch to ⅛-inch bore by 5/16-inch outside diameter. This makes a rubber tubing connection and eliminates the necessity of a stopper.

Length of enlarged tube, inches	24	30
Length over all, inches	25	31
Inside diameter of tube, inches	¾	⅞
Each	**$6.95**	**9.25**

7-610. CHARGER AND RAKE, for Combustion Tubes. Made of Chromel "A," 80% nickel and 20% chromium, practically iron-free, which will withstand the heat of the furnace.

It has a hook on one end for engaging the combustion boat when inserting or withdrawing the boat. The other end has a scraper shaped to the curvature of the tube and is used to withdraw any boat lining should it be spilled in the tube. The handle is 30 inches long. This is very handy for performing the operations which are done repeatedly in making carbon combustions. **Each, $2.75**

7-615

7-617

7-616

7-620

7-615. COMBUSTION TUBES, Clay, Johnson. Made of a special clay which is highly refractory. One end of the tube is reduced for tubing connection, and by using the Tapered Clay Connector No. 7-616 and the Rubber Sleeve No. 7-617 tubing can be connected to both ends.

Tube	A	B
Length over all, inches	25	28
Inside diameter, inches	¾	$\frac{15}{16}$
Tube only, Each	**$6.50**	**7.50**

7-616. TAPERED CONNECTOR, Clay, for No. 7-615 Tubes.

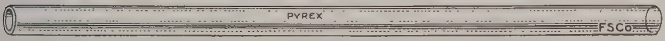
For tube	A	B
Each	**$2.25**	**2.50**

7-617. RUBBER SLEEVE, for No. 7-615 Tubes, to attach the tapered connector.

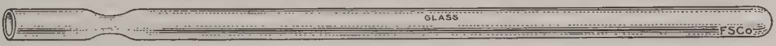
For tube	A	B
Each	**$1.00**	**1.25**

7-620. COMBUSTION TUBES, Porcelain. Glazed on the outside only. Used for low temperature carbonization, distillation or gas generation; not recommended for carbon combustions.

Length, mm	600	600
Diameter inside, mm	20	25
Each	**$4.25**	**4.90**



7-625



7-630

7-635

7-625. COMBUSTION TUBE, Pyrex Glass. Made of heavy wall Pyrex glass, with both ends open and fused to avoid cutting the stoppers. Used for organic combustions, etc., but not suitable for carbon combustions.

Length, mm	600	750
Inside diameter, about, mm	15	19
Outside diameter, about, mm	20	25
Each	**$1.00**	**1.80**

7-630. COMBUSTION TUBE, Carius, Glass. "Bomb tube," made of heavy wall lime glass, closed at one end with **constriction for sealing** at the other. Used for the determination of sulphur or halogens in organic compounds according to the method of Carius.
Length, over all, 700 mm. Length to constriction, 615 mm. Outside diameter, 22 mm. **Each, $1.00**

7-635. COMBUSTION TUBE, Glass. For use with Carius or Freas Furnaces, for organic combustion tests. Made of heavy wall lime glass with one end closed. Length, 600 mm. Outside diameter, 22 mm. **Each, $ .80**

6-815

6-820

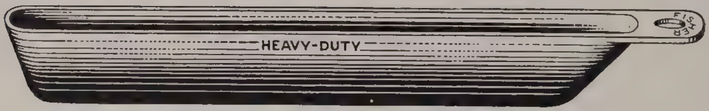
6-815. COMBUSTION TUBE, Silica, for Coal Distillation. One end closed. Length, 500 mm.; inside diameter, 18 to 20 mm. **Each, $5.45**

6-820. COMBUSTION TUBE, Pyrex Glass, for Coal Distillation. One end closed. Length, 500 mm.; inside diameter, 17 to 19 mm. This is the hardest glass available, but it is not guaranteed for more than one combustion. **Each, $1.45**

COMBUSTION TUBE PROTECTORS. See No. 7-685.
COMBUSTION TUBE FURNACE, for Organic Combustions. See Furnaces, pages 363 and 368.

FISHER

HEAVY-DUTY COMBUSTION BOAT



7-645

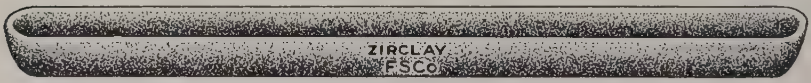
7-645. COMBUSTION BOAT, Fisher, Heavy Duty. Made of a special grade of nickel; large size with heavy walls. This is a heavy duty boat which we have made for many Iron and Steel Laboratories in the Pittsburgh District.

It is 4¼ inches long over all; the body is 3¾ inches long and the top is ⅝ inch wide and 7/16 inch deep; the total capacity is about 15 ml. It is made of heavy nickel (19 gauge) and each boat is formed by dies, bears the name "Fisher," is uniform and true in shape and will pass through a combustion tube ¾ inch inside diameter. These boats are made of a special grade of nickel which has a carbon content lower than the usual "pure" grade of nickel. As a precaution, a new boat should be preignited.

Features. Large capacity so that a large sample and a generous boat lining of Sinderite or Alundum can be used. **Heavy walls** which give it a long life and enable it to be used for a greater number of combustions. **It will not break** in handling or in heating or cooling.

Convenient. The handle facilitates the operations attendant to cleaning, charging and conveying to the combustion furnace. The hole in the handle facilitates inserting and withdrawing the boat from the furnace by means of Charger No. 7-610. The flat bottom enables the boat to stand without tipping.

Each, $ .55
Dozen lots, Each, $ .50



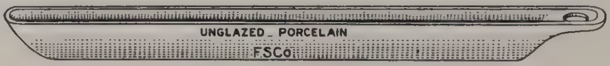
7-650

7-650. COMBUSTION BOAT, Zirclay. These boats have been made especially for burning iron and steel in making carbon combustions.

They are made of a special mixture of German Pot Clay and Zirconium and will withstand high temperatures. When used with Sinderite or Alundum lining, they will serve for many combustions.

These boats are 5 inches long and ⅝ inch wide; capacity is sufficient for a large sample, and will pass freely through a ¾-inch tube, as they are uniform and true in shape.

Each, $ .20
Per dozen, $ 2.00
Per 100, $15.00

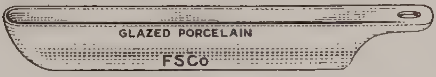


7-655

7-655. COMBUSTION BOATS, Unglazed Porcelain. Made of vitreous porcelain, not glazed; especially for igniting iron and steel samples in carbon determinations. As porcelains have higher softening points than glazes, these boats will withstand higher temperatures without softening than porcelain boats with a glaze.

The body and the handle is made in one piece, and there is a large hole in the handle which permits these boats to be easily withdrawn from the furnace by means of Charger No. 7-610. Sinderite or Alundum is recommended for lining these boats. Either size boat will pass through a combustion tube of ¾-inch bore or larger.

Size	A	B
Length over all, mm	97	130
Width, mm	16	17
Each	**$ .20**	**.25**
Per dozen	**$ 2.00**	**2.50**
Per 100	**$16.00**	**18.00**



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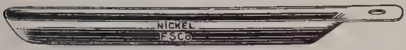

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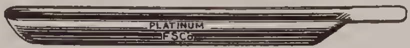


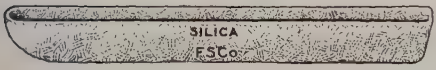
7-668

7-660. COMBUSTION BOATS, Porcelain, glazed inside and on the outside with the exception of the bottom.

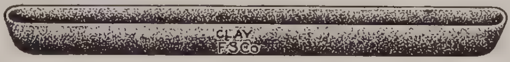
Length over all, mm	60	88	100
Width, mm	10	12	20
Each	**$ .15**	**.18**	**.20**

7-665. COMBUSTION BOAT, Pure Nickel, Small Size. Made of No. 23 gauge pure nickel sheet with hole in the handle. The body of the boat is 3 inches long and ½ inch wide. **Each, $ .45**
Per dozen, $5.00

7-668. COMBUSTION BOAT, Platinum; used principally in research work. Length, 2½ inches; width, ⅜ inch; weight, about, 6 grams. This boat is hammered to shape. The price, per gram, is made according to the current quotation for platinum. **Price on application.**



7-670



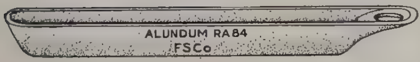
7-675

7-670. COMBUSTION BOATS, Silica, Glazed. Made of pure fused silica, completely glazed inside and outside, without handles.

Length, mm	75	100	155
Width, mm	15	19	19
Each	**$1.00**	**1.50**	**2.00**

7-675. COMBUSTION BOATS, Johnson. Made of vitrified clay which is highly refractory; these boats can be used repeatedly.

Size	A	B
Length, inches	4¾	4
Width, inches	⅝	¾
Per dozen	**$ 2.75**	**3.00**
Per 100	**$21.00**	**23.00**



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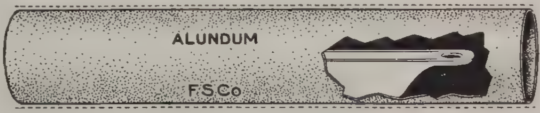


7-685

7-680. COMBUSTION BOATS, Alundum. Made in one piece with handle, of a mixture known as RA-84.

Size No.	1	2	3	4
Length over all, inches	3½	3¾	5	5½
Width, inches	½	⅝	¾	½
Each	**$ .30**	**.30**	**.30**	**.30**

7-685. COMBUSTION BOAT SHIELD, Alundum. A short, thin walled tube into which the combustion boat is placed when inserted in the combustion tube. It protects the tube from the sputtering sample and increases its life.

Size No.	1	2
Outside diameter, inches	¾	⅞
Inside diameter, inches	11/16	13/16
Length, inches	4½	5½
Each	**$2.10**	**2.20**

Combustion Apparatus

7-690

7-695

7-700

7-690. SINDERITE, COMBUSTION BOAT LINING. Chromium oxide ore especially prepared for making carbon combustions; used extensively in the Pittsburgh District. The material is ground and sieved, 80–100 mesh; washed in acid and ignited. Sinderite will not absorb CO_2, and if used according to directions it will insure complete combustion of an iron or steel sample, and prevent the combustion boat from fluxing so that it can be used repeatedly.

DIRECTIONS: Fill the boat with Sinderite and press it down firmly with a spatula, then make a small V-shaped gutter in the middle and press the material so that it will adhere to the sides of the boat. Place the drillings in the depression, scatter a light coat of Sinderite on the top of the drillings, and press again with a spatula.

If the sample is prepared in this way, a complete combustion will be insured and the remaining "pig" will be found to be extremely porous and easily removed from the boat without any fluxing of the pig with the boat. The Sinderite on the top of the sample reduces the spattering during combustion.

Put up in sealed glass stoppered bottles.

Per 1 lb. bottle, $ .95
Per 2 lb. bottle, $1.40
Per 5 lb. bottle, $2.90

7-695. ALUNDUM, COMBUSTION BOAT LINING, White Label. Crystalline alumina for protecting combustion boats from fluxing. Put up in sealed glass stoppered bottles. Sixty mesh is the grade most used.

Mesh	46	60	90
Per 1 lb. bottle	**$1.05**	**$1.05**	**1.05**
Per 2 lb. bottle	**$1.50**	**$1.50**	**1.50**
Per 5 lb. bottle	**$3.00**	**$3.00**	**3.00**

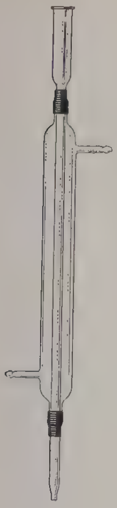
7-700. ALUNDUM, COMBUSTION BOAT LINING, Blue Label. This grade has been especially prepared for carbon combustions. It has been treated to remove carbonaceous matter and surface alkali. The carbon content is maintained below .003%. Put up in sealed glass stoppered bottles. Sixty mesh is the grade most used.

Mesh	60	90
Per 1 lb. bottle	**1.30**	**1.30**
Per 2 lb. bottle	**1.95**	**1.95**
Per 5 lb. bottle	**3.70**	**3.70**

CHEMICALS REAGENTS

IMMEDIATE DELIVERY

See Chemical and Reagent List in the rear of this catalogue.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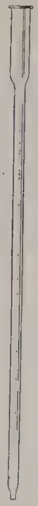
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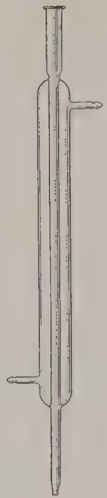
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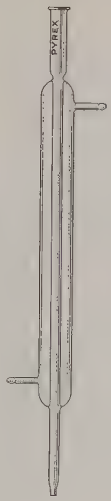

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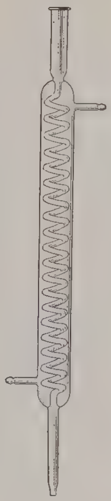
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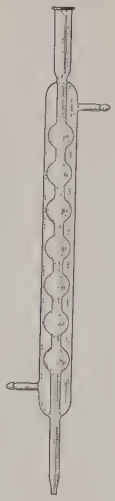
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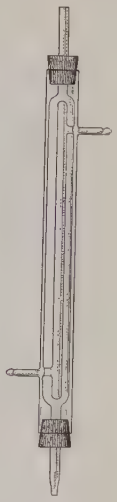

7-735

REGARDING CONDENSERS AND CONDENSER TROUGHS

Each condenser described has been standardized and has been made according to a blueprint with specifications controlling the proper thickness of walls, etc.

For Condenser Troughs used in Tar Dehydrating, see No. 1-615. For Condenser Troughs used in the Distillation of Benzol, see No. 6-880. For Condenser Troughs used in the Distillation of Gasoline and other light oils, see Petroleum Testing Apparatus, page 489. For Condenser Troughs used in the distillation of Turpentine and paint thinners, see page 483.

7-705. CONDENSERS, Liebig, with Rubber Connections. Jacket and condenser tube are made of glass, held with a rubber connection. These condensers are standardized and either the jacket or the condenser tube may be replaced from our stock. The length of body is measured from shoulder to shoulder.

*Length of body, mm	300	400	500	600	750
Each	**$1.10**	**1.30**	**1.60**	**1.90**	**2.40**

7-710. CONDENSER TUBES, for Condensers No. 7-705 and No. 7-750. Made of glass with adapter at top, lower end tapered. Of proper dimensions to fit the jackets of the two condensers mentioned.

*For condenser body, mm	300	400	500	600	750
Each	**$ .40**	**.45**	**.55**	**.65**	**.80**

7-715. CONDENSERS, Liebig, Sealed. Made of glass with the jacket sealed to the condenser tube. With this condenser there is no liability of the cooling water leaking at the joint and getting into the condensed liquid.

*Length of body, mm	250	300	400	500	600
Each	**$1.20**	**1.45**	**1.70**	**1.95**	**2.15**

7-720. CONDENSERS, Liebig, Pyrex Glass, Sealed. A very substantial condenser made entirely of Pyrex glass with jacket sealed to the condensing tube. The jacket is heavier than the other glass condensers and with the low coefficient of expansion of Pyrex glass, the liability of breakage by handling and heat changes is less with this condenser.

Length of body, mm	250	300	500	600
Each	**$2.50**	**2.80**	**4.00**	**4.40**

7-725. CONDENSERS, with Coiled Tubes. Made of glass with the condensing tube coiled to provide a larger condensing surface. The jacket is sealed to the condensing tube.

*Length of body, mm	200	300	400
Each	**$1.80**	**2.15**	**2.50**

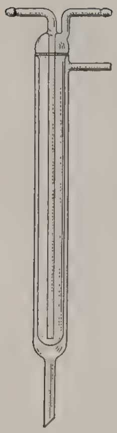
7-730. CONDENSERS, Allihn. Made of glass; condensing tube is made with bulbs; water-jacket is sealed to the condensing tube. May be used in the usual manner, and also in a vertical position as a reflux condenser with vapors entering at the bottom. The bulbs increase the condensing surface and lessen the resistance to the passage of the vapors.

*Length of jacket, mm	200	300	400	600
Number of bulbs	4	5	7	12
Each	**$1.80**	**2.15**	**2.50**	**3.00**

7-735. CONDENSER, Compound. Made of glass, with inner and outer water jacket. This condenser has double the amount of cooling surface of an ordinary condenser of the same length, therefore, it is twice as effective and rapid. The length of the enlarged condensing tube, shoulder to shoulder, is 450 mm. **Each, $3.90**

**Sizes adopted by the American Chemical Society, Standardization Committee*

Condensers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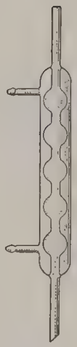
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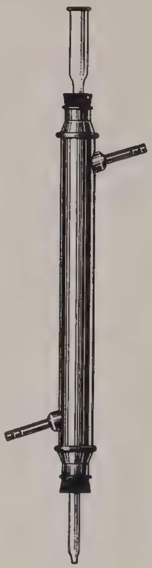
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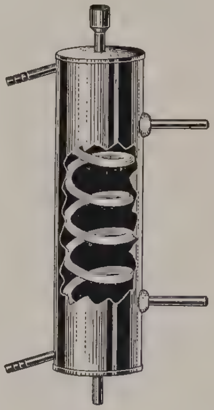
7-755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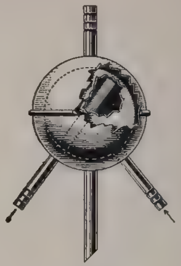
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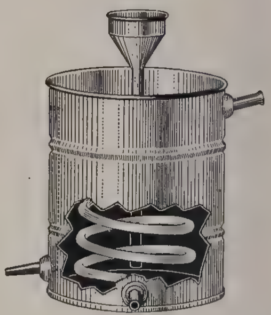

7-765

7-740. CONDENSER, Hopkins, Reflux, designed by Prof. C. G. Hopkins. Made entirely of glass with a water cooled tube inside which is 25 mm. outside diameter and 250 mm. long, and is provided with water inlet and outlet. This inner tube is sealed into a stronger outer tube which has a vent at the top and its lower end is reduced and ground to a point. Counter-current condensation is obtained by introducing the cooling water at the top of the inner tube and withdrawing it from the bottom. Used as a reflux condenser in extractions; may also be used for fractionations. The total length is 380 mm. **Each, $3.60**

7-745. CONDENSERS, for Extractors. Made of glass, with bulbs to enlarge the condensing surface; condensing tube and jacket sealed. Used primarily as reflux condensers for extraction apparatus; are also very convenient for general use where a small condenser is desired.

Length of body, mm	200	225	250
Number of bulbs	5	6	7
Each	**$1.80**	**2.10**	**2.40**

7-750. CONDENSERS, with Brass Jackets. Consists of a glass condensing tube, two rubber stoppers and a polished brass water-jacket. The condenser tube has an adapter at one end and is tapered at the other end. On account of the greater mechanical strength of the metal jacket, this condenser is often used for semi-commercial apparatus and for use in plants.

Length of body, mm	375	500	750
Each, complete	**$4.50**	**5.00**	**5.75**

For extra condensing tubes, see No. 7-710

7-755. CONDENSER TUBES, Pyrex Glass. Straight condenser tubes for use with the brass jackets of Condensers No. 7-750; made of **Pyrex glass.**

For condenser body, mm	375	500	750
Each	**$ .60**	**.75**	**1.00**

7-760. CONDENSER, Hallock, Block Tin Coil. Made with a polished copper jacket, 14½ inches long and 4 inches in diameter; provided with two supporting rods, so that the condenser can be attached to a support by means of Clamp Holders No. 5-755. The condensing coil is made of pure block tin, making it suitable for distilling water, also for determining ammonia nitrogen by the distillation method, etc. **Each, $7.50**

7-765. CONDENSERS, Zinc, with Tin Coil. The container is made of zinc, the cooling water enters through the funnel-topped tube, is conveyed to the bottom and leaves through the overflow tube which maintains a large volume of cooling water at a constant level.

The condensing coil is made of **pure block tin** which is very resistant to the chemical action of vapors. The sizes listed are for use with retorts of the capacities mentioned.

For retort, capacity, gallons	½	1	2	3
Each	**$6.50**	**7.75**	**9.50**	**12.00**

Upon receipt of orders for these condensers, we will supply blanks to be filled out to comply with United States Treasury Decision 3068.

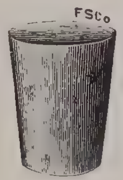
7-770. CONDENSER, Soxhlet, Nickel-Plated. A reflux condenser used for extractions and similar operations. Made with two copper spheres, one inside the other; nickel-plated and polished outside. The cooling water is conveyed to the bottom of the inner sphere and leaves through an outlet at the top.

The **condensing surfaces** and the connecting tubes **are tinned,** so that the vapors never come in contact with the copper. Diameter of outside sphere, 4 inches; height over all, 9 inches. **Each, $4.50**

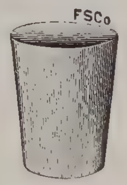
CONDENSER CLAMPS. See Clamps. **CONDENSER SUPPORTS.** See Supports.
CONDUCTIVITY APPARATUS. See Electro-Chemical Apparatus.
CONES. See Filter Cones and Pyrometer Cones.

LABORATORY CORKS

7-780



7-790



7-800

7-780
See also No. 7-785

7-790
See also No. 7-795

7-800
See also No. 7-805

REGARDING CORKS

The XXX quality cork is the least expensive cork that we can recommend as being satisfactory for the usual laboratory purposes. This XXX quality and two better qualities are carried in our regular stock, but the lower grade XX quality is not.

7-780. CORKS, XXX Quality, Regular Length. Cut from a selected grade of wood, and all corks not coming up to the XXX quality are eliminated.

This regular length cork is the shape most used.

No.	0	1	2	3	4	5	6	7	8	9
Length, mm.	13	16	17	19	20	22	24	25	26	28
Top diameter, mm.	10	11	12	14	15	17	19	20	22	23
Bottom diameter, mm.	7	8	9	11	12	13	15	16	17	18
Per bag of 100	**$ .27**	**.27**	**.30**	**.35**	**.40**	**.42**	**.45**	**.50**	**.60**	**.75**
Per bag of 500	**$1.08**	**1.08**	**1.20**	**1.40**	**1.60**	**1.68**	**1.80**	**2.00**	**2.40**	**3.00**

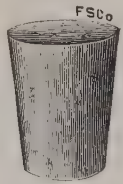
No.	10	11	12	13	14	15	16	17	18
Length, mm.	31	31	31	31	31	31	38	38	38
Top diameter, mm.	25	26	28	29	31	33	34	36	37
Bottom diameter, mm.	20	21	23	24	25	28	27	29	30
Per bag of 100	**$ .82**	**.90**	**1.00**	**1.05**	**1.12**	**1.25**	**1.55**	**1.70**	**1.82**
Per bag of 500	**$3.28**	**3.60**	**4.00**	**4.20**	**4.48**	**5.00**	**6.20**	**6.80**	**7.28**

No.	19	20	22	24	26
Length, mm.	38	38	38	38	38
Top diameter, mm.	39	40	44	47	50
Bottom diameter, mm.	32	33	38	40	44
Per bag of 100	**$1.85**	**2.05**	**2.40**	**2.90**	**3.35**
Per bag of 500	**$7.40**	**8.20**	**9.60**	**11.60**	**13.40**

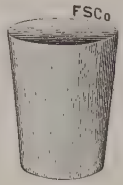
7-785. CORKS, XXX Quality, Regular Length, assorted, Nos. 6 to 15 inclusive. Each bag contains 10 of each of these 10 popular sizes, and makes a handy assortment from which to select a cork for a particular purpose.
Per bag of 100, $ .85

Corks

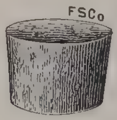
7-780
See also No. 7-785



7-790
See also No. 7-795



7-800
See also No. 7-805



7-810
See also No. 7-815

7-790. CORKS, XXXX Quality, Regular Length. This quality of cork is higher than the XXX quality; they are cut from a superior grade of wood, and all corks not coming up to the XXXX quality are eliminated.

No.	1	2	3	4	5	6	7	8	9	10	11
Length, mm	16	17	19	20	22	24	25	26	28	31	31
Top diameter, mm	11	12	14	15	17	19	20	22	23	25	26
Bottom diameter, mm	8	9	11	12	13	15	16	17	18	20	21
Per bag of 100	**$ .33**	**.40**	**.45**	**.48**	**.55**	**.60**	**.70**	**.90**	**1.00**	**1.10**	**1.20**
Per bag of 500	**$1.32**	**1.60**	**1.80**	**1.92**	**2.20**	**2.40**	**2.80**	**3.60**	**4.00**	**4.40**	**4.80**

No.	12	13	14	15	16	17	18	19	20
Length, mm	31	31	31	31	38	38	38	38	38
Top diameter, mm	28	29	31	33	34	36	37	39	40
Bottom diameter, mm	23	24	25	28	27	29	30	32	33
Per bag of 100	**$1.35**	**1.50**	**1.70**	**1.80**	**2.25**	**2.40**	**2.60**	**2.80**	**3.00**
Per bag of 500	**$5.40**	**6.00**	**6.80**	**7.20**	**9.00**	**9.60**	**10.40**	**11.20**	**12.00**

7-795. CORKS, XXXX Quality, Regular Length, assorted, Nos. 6 to 15 inclusive. Each bag contains 10 of each of these 10 popular sizes, and makes a handy assortment from which to select a cork for a particular purpose. **Per bag of 100, $1.20**

7-800. CORKS, Select Velvet, Regular Length. These are especially fine grained, smooth corks of a higher quality than the XXXX grade. They are cut from the finest quality of wood, and are then selected. We recommend this quality for use with volatile liquids, for extraction and distillation apparatus and for all purposes where an especially uniform and smooth cork is desired.

No.	1	2	3	4	5	6	7	8	9	10	11
Length, mm	16	17	19	20	22	24	25	26	28	31	31
Top diameter, mm	11	12	14	15	17	19	20	22	23	25	26
Bottom diameter, mm	8	9	11	12	13	15	16	17	18	20	21
Per 10	**$ .10**	**.10**	**.10**	**.10**	**.12**	**.13**	**.15**	**.18**	**.20**	**.22**	**.24**
Per bag of 100	**$ .45**	**.48**	**.55**	**.70**	**.83**	**.93**	**1.00**	**1.20**	**1.45**	**1.65**	**1.80**
Per bag of 500	**$1.80**	**1.92**	**2.20**	**2.80**	**3.32**	**3.72**	**4.00**	**4.80**	**5.80**	**6.60**	**7.20**

No.	12	13	14	15	16	17	18	20
Length, mm	31	31	31	31	38	38	38	38
Top diameter, mm	28	29	31	33	34	36	37	40
Bottom diameter, mm	23	24	25	28	27	29	30	33
Per 10	**$ .25**	**.28**	**.30**	**.35**	**.40**	**.45**	**.45**	**.50**
Per bag of 100	**$1.85**	**2.05**	**2.35**	**2.70**	**3.33**	**3.60**	**3.85**	**4.30**
Per bag of 500	**$7.40**	**8.20**	**9.40**	**10.80**	**13.32**	**14.40**	.....	.....

7-805. CORKS, Select Velvet, Regular Length, assorted, Nos. 6 to 15 inclusive. Each bag contains 10 of each of these 10 popular sizes, and makes a handy assortment from which to select a cork for a particular purpose. **Per bag of 100, $1.75**

7-810. CORKS, XXX Quality, Short Length. These corks are of the same grade as No. 7-780, but are short length.

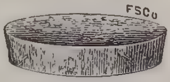
No.	7	8	9	10	12	13
Length, mm	19	19	19	25	25	25
Top diameter, mm	20	22	23	25	28	30
Bottom diameter, mm	17	19	20	21	23	25
Per bag of 100	**$ .40**	**.50**	**.58**	**.72**	**.85**	**.92**
Per bag of 500	**$1.60**	**2.00**	**2.32**	**2.88**	**3.40**	**3.68**

No.	14	15	16	17	18	20
Length, mm	25	25	25	25	25	25
Top diameter, mm	31	33	35	36	38	41
Bottom diameter, mm	27	28	30	31	33	36
Per bag of 100	**$ .95**	**1.10**	**1.18**	**1.30**	**1.40**	**1.65**
Per bag of 500	**$3.80**	**4.40**	**4.72**	**5.20**	**5.60**	**6.60**

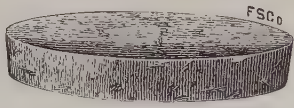
Other sizes will be supplied to order.

7-815. CORKS, XXX Quality, Short Length, assorted, Nos. 7 to 16 inclusive. Each bag contains 10 of each of these 10 popular sizes, and makes a handy assortment from which to select a cork for a particular purpose. **Per bag of 100, $ .80**

7-820



7-825



7-830

7-820. CORKS, XXX Quality, flat, 13 mm. high. These XXX flat corks are cut from the same quality wood as the XXX regular length corks listed under No. 7-780, and have a slight taper.

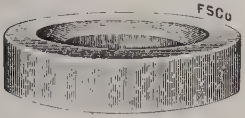
Top diameter, mm	19	22	25	28	31	34
Per 100	**$ .95**	**.95**	**1.08**	**1.30**	**1.55**	**1.70**
Per 500	**$3.80**	**3.80**	**4.32**	**5.20**	**6.20**	**6.80**

7-825. CORKS, XXX Quality, flat, 16 mm. high, slight taper.

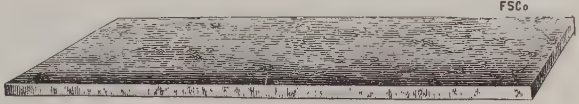
Top diameter, mm	38	41	44	47	50	53
Per 10	**$ .28**	**.30**	**.38**	**.45**	**.48**	**.55**
Per 100	**$2.52**	**2.70**	**3.42**	**4.05**	**4.32**	**4.95**
Top diameter, mm	56	59	63	66	69	72
Per 10	**$ .62**	**.70**	**.80**	**.90**	**.92**	**1.00**
Per 100	**$5.58**	**6.30**	**7.20**	**8.10**	**8.28**	**9.00**

7-830. CORKS, XXX Quality, flat, 19 mm. high, slight taper.

Top diameter, mm	75	81	88	94	100	113
Each	**$ .15**	**.19**	**.25**	**.28**	**.32**	**.40**
Per 10	**$1.35**	**1.71**	**2.25**	**2.52**	**2.88**	**3.60**



7-835



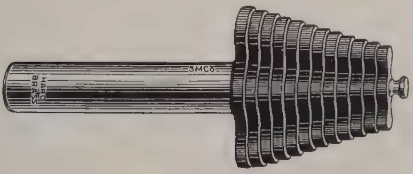
7-840

7-835. CORK RINGS (Suberite); made of compressed cork, for supporting flasks, dishes, etc. Superior to straw rings, being neater and more durable.

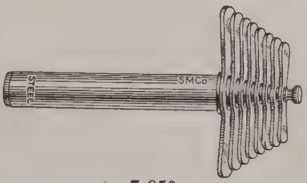
Diameter (inside), mm	60	90	120	150
Each	**$ .65**	**.80**	**1.05**	**1.40**
Per 10	**$5.58**	**7.20**	**9.45**	**12.50**

7-840. CORK SHEETS, length, 300 mm.; width, 100 mm.

Thickness, mm	3	5	6
Each	**$ .20**	**.30**	.35
Per 10	**$1.60**	**2.40**	2.80



7-845



7-850

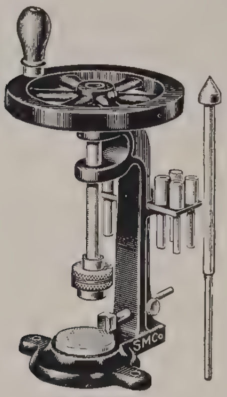
7-845. CORK BORERS, polished hard brass, with individual handles of black-enameled iron. A punch for removing the extracted part is furnished with each set.

No. in set	3	6	9	12	15
Outside diam. of borers, inches	$\frac{3}{16}$–$\frac{5}{16}$	$\frac{3}{16}$–$\frac{7}{16}$	$\frac{3}{16}$–$\frac{5}{8}$	$\frac{3}{16}$–$\frac{3}{4}$	$\frac{3}{16}$–$\frac{7}{8}$
Outside diam. of borers, mm	5 to 7.5	5 to 11	5 to 15	5 to 19	5 to 22
Per set	**$ .60**	**1.20**	**2.00**	**2.75**	**3.50**

7-850. CORK BORERS, polished steel, with individual handles and punch for each set. Because of the hardness of this metal, the borers maintain fine cutting edges. Diameters of borers differ by $\frac{1}{16}$ of an inch.

No. in set	3	6	10
Outside diam. of borers, inches	$\frac{3}{16}$–$\frac{5}{16}$	$\frac{3}{16}$–$\frac{1}{2}$	$\frac{3}{16}$–$\frac{3}{4}$
Outside diam. of borers, mm	5 to 7.5	5 to 13	5 to 19
Per set	**$2.00**	**3.25**	**5.75**

Cork Borers



7-855
See also No. 7-860

7-865

7-870

7-855. CORK BORING MACHINE. For boring holes in corks, or rubber stoppers; can be screwed to the table. Machine has nickel-plated adjustable guide, making it possible to bore a hole in any part of the stopper. The stopper rests on the roughened plate which prevents it from turning. The nickel-plated shaft can be set at any desired height by means of a set screw. By releasing the set screw, the weight of the shaft and wheel is brought to bear upon the stopper, then several turns of the handle of the wheel will bore the desired hole. The nickel-plated chuck will accommodate all sizes of borers furnished.

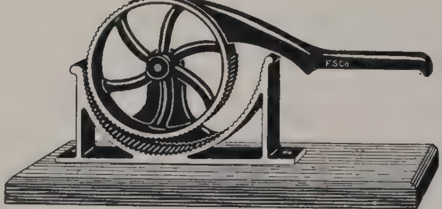
Supplied with a set of eight steel borers, 3/16 to 5/8 inch diameter, and a nickel-plated punch for removing the extracted part of the stopper. Machine has a rack for holding the borers when not in use. The cast parts of this machine are black enameled. **Each, $23.00**

7-860. EXTRA BORERS for No. 7-855 Machine. Eight steel borers, 3/16 to 5/8 inch diameter: supplied in sets only. **Per set of eight, $4.50**

7-865. CORK BORER SHARPENER. A brass cone with steel blade. With this tool the sharpening of a cork borer is a simple operation, as the cone-shaped mandrel bears against the inside of the cutting edge while the knife is applied to the outside. **Each, $1.50**

7-870. CORK FILES, round, for smoothing or enlarging holes cut with a cork borer; length of cut portion, 125 mm. **Each, $ .20**
Per dozen, $1.80

7-875



7-880

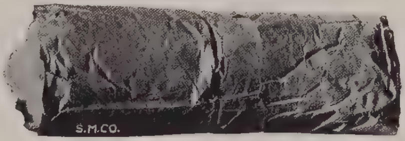
7-885

7-875. CORK KNIFE, very useful for cutting corks; length of blade, 75 mm. . . . . **Each, $ .25**

7-880. CORK PRESS, Rotary. Rolls corks into the desired tapering shape without splitting them. For corks 5 mm. to 32 mm. **Each, $2.25**

7-885. CORKSCREW. Strong metal screw with a heavy wooden handle; adapted for drawing corks from any size bottle. **Each, $ .40**

7-890 7-895



7-900

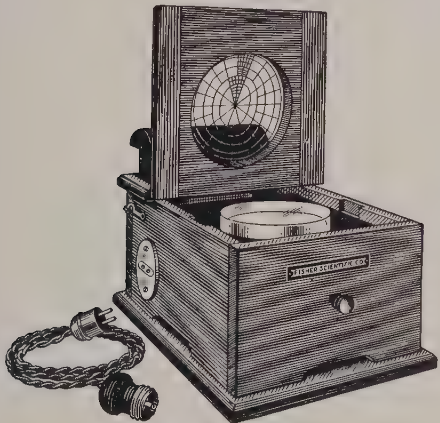
COTS, Finger, of asbestos or rubber. See Finger Cots.

7-890. **COTTON, Aseptic, Absorbent;** used for First Aid and also for absorbing samples to be transferred to extraction apparatus. Each package is put up in a one-pound roll, with tissue paper backing, and carefully packed in an individual carton.
Per pound, $ .80

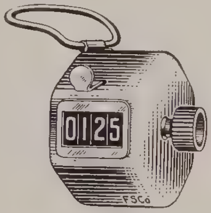
7-895. **COTTON, Aseptic, Non-absorbent;** absolutely sterile; used as a high grade material for plugging bacteriological apparatus and also as a filter to catch dust particles in air analysis. Each package is put up in a one-pound roll, with tissue paper backing, and carefully packed in an individual carton.
Per pound, $1.00

7-900. **COTTON, Sanitary;** thoroughly washed; free from black specks and lint. This is a good grade of cotton for plugging test tubes, etc., in routine bacteriological work. Each package contains one pound and is wrapped separately.
Per pound, $ .50
10 pounds, $4.50

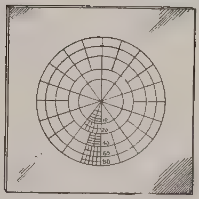
COTTON CLOTH, for dusting and filtering purposes. See No. 6-665.


FISHER SCIENTIFIC CO.

7-910



7-905



7-915
See also No. 7-920

7-905. **COUNTER, Hand Tally,** used to count colonies of bacteria, the falling of drops from a pipette, the number of strokes of a pendulum, etc.

The case is small in size and has been designed with rounded corners so as not to irritate the hand of the user nor to wear the pockets when carrying it. A finger ring attached, enables it to be held conveniently in either hand. There are four number-wheels counting up to 9999. By turning the small knob on the side, the counter can be quickly set at zero.
Each, $5.00

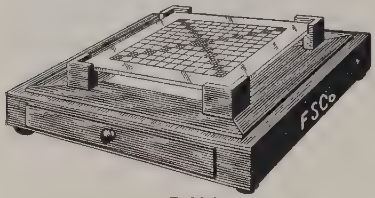
7-910. **COUNTING APPARATUS, Plate Culture, Stewart;** for counting colonies of bacteria in Petri dishes after incubation. For technique, see *Journal of Medical Research, January, 1906.*

The apparatus consists of a hard-wood cabinet, 275 mm. long, 200 mm. wide and 165 mm. high, fitted with a Stewart Counting Plate, 145x145 mm., with a ruled area 100 mm. diameter. The Petri dish is placed under the counting plate and upon an adjustable shelf, which can be raised or lowered to eliminate shadows. The source of light is a 15-watt, electric lamp whose rays enter the Petri dish at an angle and do not come to the eye directly. To assist in diffusing the light, the inner walls of the cabinet are painted with aluminum paint. A cobalt-blue glass, 150x165 mm., is put on the shelf under the Petri dish to absorb the yellow rays of light and to produce the daylight effect. The cabinet is ventilated and the metal hood, over the lamp, allows circulation of air without permitting outside light to enter the cabinet.

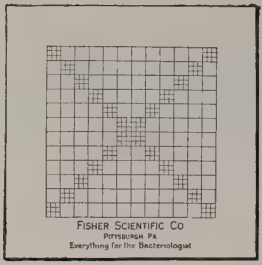
Supplied complete, with cord, plug and 15-watt electric lamp, for 110 volts. The electrical connection to the cabinet is made by a special plug, which can be quickly attached or detached.
Each, $21.00

7-915. **COUNTING PLATE, Stewart;** on glass, 145x145 mm., with ruled area 100 mm. diameter. Used with Stewart Counting Apparatus No. 7-910.
Each, $3.50

7-920. **COBALT BLUE GLASS,** 150x165 mm., to produce the daylight effect in Stewart Counting Apparatus No. 7-910.
Each, $ .75



7-925



7-935

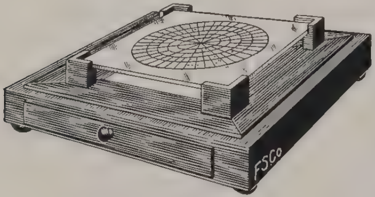
7-925. COUNTING APPARATUS, Plate Culture, Wolffheugel; for counting colonies of bacteria in Petri dishes, after incubation.

The apparatus consists of a hard-wood base, 245x245 mm., fitted with a Wolffheugel Counting Plate, 165x165 mm., with a ruled area 120 mm. square. The drawer in the base is large enough to contain the counting plate, etc. The Petri dish is placed under the counting plate upon a metal plate. This plate is painted white on one side and black on the other and assists in counting either light or dark colored bacteria. **Each, $9.75**

7-930. COUNTING PLATE, Wolffheugel; on glass, 165x165 mm., with ruled area 120 mm. square. *This counting plate will fit either Counting Apparatus No. 7-925 or No. 7-940.* **Each, $2.50**

7-935. COUNTING CARD, Plate Culture, Wolffheugel; for counting colonies of bacteria in Petri dishes, after incubation. The Petri dish is placed over this card and the rulings observed through the culture media. The rulings are on a heavy cardboard, printed on both sides of the card. One side has black ruling on a white background and the other side has white ruling on a black background. The counting card measures 190x190 mm., with the ruled area 120 mm. square. **Each, $ .15**

Per dozen, 20% discount



7-940

7-950

7-940. COUNTING APPARATUS, Plate Culture, Jeffer; for counting colonies of bacteria in Petri dishes, after incubation. For method, see *Journal of Applied Microscopy and Laboratory Methods, Vol. I, No. 3.*

This apparatus is similar to No. 7-925 and differs only in the ruled glass counting plates supplied. The Jeffer Counting Plate is of the radial type, 165x165 mm., with a ruled area 132 mm. diameter. The numbers indicate how many equal subdivisions are to be found by counting around the plate at that distance from the center. **Each, $11.00**

7-945. COUNTING PLATE, Jeffer; on glass, 165x165 mm., with ruled area 132 mm. diameter. *This counting plate will fit either Counting Apparatus No. 7-925 or No. 7-940.* **Each, $3.75**

7-950. COUNTING-PLATE MAGNIFIER; used in counting bacteria in plate cultures, recommended by the American Public Health Association in their standard methods.

The magnifier has two plano-convex lenses, in vulcanite mounting. This glass gives a large flat field, with a 3.5 x magnification. The diameter of the lens is 40 mm. **Each, $4.50**

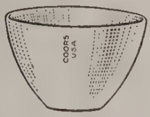
COUNTING CHAMBERS, for Blood and Spinal Fluids. See Haemacytometers No. 6-025 to No. 6-245.
COVER GLASSES, Microscope. See Microscopical Apparatus, page 453.

OTHER BACTERIOLOGICAL APPARATUS

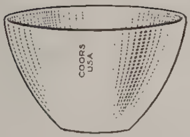
In addition to Counting Apparatus, we carry a full line of apparatus and chemicals for the bacteriological laboratory.

Apparatus is shown in alphabetical order throughout this catalogue. See Balances, Centrifuges, Clinical Diagnostic Apparatus, Dishes, Fermentation Tubes, Incubators, Microscopes, Milk Testing Apparatus, Ovens, Pipettes, Test Tubes, Thermometers, Sterilizers, etc.

Culture Media, Stains and Test Solutions are listed in the rear of this catalogue.



CRUCIBLES



7-955

7-960
See also 7-970

7-965

REGARDING COORS—U. S. A. CHEMICAL PORCELAIN

FISHER SCIENTIFIC CO. — DISTRIBUTING AGENTS

THE THERMAL RESISTANCE AND GLAZE of Coors-U. S. A. Porcelain have been developed to a high degree. Laboratories all over the United States, working in different branches of chemistry, report satisfactory service from this ware.

THE STANDARDIZED SIZES of Coors crucibles, recently adopted by the American Chemical Society, Standardization Committee, are those listed in this catalogue; they are all carried in stock. This stock is maintained by anticipating the period of time required to manufacture porcelain.

OUR PRICES, f.o.b. Pittsburgh, are the same as the factory prices f.o.b. Colorado, and we do not charge for boxes or packing. This effects a saving to the user of the packing charges and the cost of transportation from Colorado.

OUR DISCOUNTS apply to the Total List Prices of all Coors Porcelain on one order, including Casseroles, Crucibles, Dishes, etc.

Lots of $ 500.00 List Prices	**10% Discount**
Lots of 750.00 List Prices	**15% Discount**
Lots of 1000.00 List Prices	**20% Discount**

7-955. CRUCIBLES, Porcelain, Coors, Wide Form, without covers; glazed inside and outside with the exception of the outside bottom surface. This low wide shape is the one most used. For covers, see No. 7-960.

*Size, No	000	00	0	1	2	3	4	5
Capacity, ml	8	12	17	30	50	90	145	265
Diameter at top, mm	32	37	41	46	56	67	81	96
Height, mm	19	21	25	29	36	44	52	65
Each	**$ .08**	**.10**	**.12**	**.16**	**.22**	**.27**	**.36**	**.45**

7-960. CRUCIBLE COVERS, Porcelain, Coors; for wide-form Crucibles No. 7-955.

*For Crucible, No	000	00	0	1	2	3	4	5
Diameter of cover, mm	39	44	47	52	65	76	88	107
Each	**$ .04**	**.04**	**.05**	**.05**	**.07**	**.08**	**.11**	**.14**

7-965. CRUCIBLES, Porcelain, Coors, High Form, without covers; glazed inside and outside with the exception of the outside bottom surface. This high-form crucible is sometimes referred to as the platinum-crucible shape. For covers, see No. 7-970.

*Size, No	00	0	1	2
Capacity, ml	10	15	30	57
Diameter at top, mm	30	35	41	52
Height, mm	25	27	35	43
Each	**$ .08**	**.10**	**.16**	**.20**

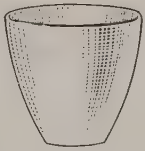
7-970. CRUCIBLE COVERS, Porcelain, Coors; for high-form Crucibles No. 7-965.

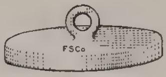
*For Crucible, No	00	0	1	2
Diameter of cover, mm	35	42	47	59
Each	**$ .04**	**.04**	**.05**	**.06**

**Sizes adopted by the American Chemical Society, Standardization Committee.*

Crucibles

7-975


7-985



7-980
See also 7-990

7-995

8-000

7-975. CRUCIBLES, Porcelain, Imported, Wide Form, without covers; glazed inside and outside except the outside bottom surface. To meet the demand, we offer this less expensive imported porcelain, which is the same quality that has been supplied for many years. For covers, see No. 7-980.

Size, No	000	00	0	1	2
Capacity, ml	8	13	17	30	50
Diameter at top, mm	25	34	40	46	56
Each	$ .08	.10	.12	.16	.22

Per hundred, 15% discount.

7-980. CRUCIBLE COVERS, Porcelain, Imported; for wide-form Crucibles No. 7-975.

For Crucible, No	000	00	0	1	2
Each	$ .04	.04	.05	.05	.07

Per hundred, 15% discount.

7-985. CRUCIBLES, Porcelain, Imported, High Form, without covers; glazed inside and outside except the outside bottom surface. The quality of porcelain is the same as that of Crucibles No. 7-975. For covers, see No. 7-990.

Size, No	8	7	6	4
Capacity, ml	10	18	30	60
Diameter at top, mm	30	35	42	55
Each	$ .08	.10	.20	.25

Per hundred, 15% discount.

7-990. CRUCIBLE COVERS, Porcelain, Imported; for high-form Crucibles No. 7-985.

For Crucible, No	8	7	6	4
Each	$ .04	.04	.05	.06

Per hundred, 15% discount.

7-995. CRUCIBLES, Alundum, Ignition; for ignitions of carbonaceous material in general laboratory practice. These crucibles should not be used for alkali fusions. They are made of RA-84 Alundum, have a high thermal conductivity and withstand high temperatures.

Capacity, ml	20	30	40
Diameter, mm	38	40	48
Height, mm	30	40	40
Each	$ .35	.40	.40

8-000. CRUCIBLES, White Clay, Unglazed; made of hard-fired, fine, white clay. These crucibles are particularly adapted for igniting all forms of precipitates, including silica and barium sulphate, because the precipitates do not fuse as readily to this kind of crucible as to those that are glazed. Also used for annealing gold buttons in assay work.

Size	A	B	C
Diameter at top, mm	30	32	38
Height, mm	30	32	38
Per dozen	$2.50	2.50	2.50

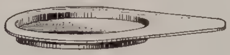
THE FISHER SCIENTIFIC COMPANIES

Pittsburgh, Pa, U. S. A.

Montreal, Canada

DEVOTED EXCLUSIVELY TO LABORATORY SUPPLIES

8-015
See also No. 8-010

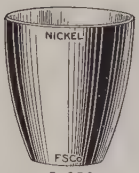


8-025

8-835

8-045

8-005



8-020

8-030

8-040

8-005. CRUCIBLES, Illium, without covers. Illium is an acid resisting alloy, with a melting point of 1280° C., which has been used successfully instead of platinum in the determination of volatile matter in coal. In this work Illium Crucibles have been found constant in weight up to 200 determinations. In general ashing tests, these crucibles can also be used where the ash will not flux with the metal and where the temperature of ignition is not above 1100° C. Flat Cover, with knob, is used for general purposes and the Insert Cover, capsule style, is recommended for use in tests to determine the volatile matter in coal.

Capacity, ml	10	20
Diameter at top, mm	25	30
Height, mm	30	40
Each	**$13.00**	**15.50**

8-010. CRUCIBLE COVERS, Illium, Flat, with knob; made to fit Illium Crucibles No. 8-005. These covers have an inside flange, which prevents the cover being easily dislodged from the crucible.

For Crucible, ml	10	20
Each	**$3.00**	**4.00**

8-015. CRUCIBLE COVERS, Illium, Insert, capsule style; made to fit Illium Crucibles No. 8-005; used in the determination of volatile matter in coal and similar tests.

For Crucible, ml	10	20
Each	**$3.75**	**5.50**

8-020. CRUCIBLES, Nickel, without covers; made of one piece of pure nickel sheet, spun to shape. The capacities given are the amounts the crucibles will hold conveniently. For covers, see No. 8-025.

Capacity, ml	20	30	50	75	100	250	500
Diameter of rim, mm	38	41	45	50	60	83	100
Each	**$ .70**	**.80**	**1.00**	**1.60**	**1.90**	**4.25**	**5.60**

Per dozen, 10% discount.

8-025. CRUCIBLE COVERS, Nickel, flat style; made to fit Nickel Crucibles No. 8-020.

For Crucible, ml	20	30	50	75	100	250	500
Each	**$ .25**	**.30**	**.30**	**.35**	**.45**	**1.10**	**1.25**

Per dozen, 10% discount.

8-030. CRUCIBLES, Platinum, without covers. Because pure platinum is very soft, a small percentage of iridium is added to give the crucibles rigidity and better wearing qualities. The crucibles are hammered to shape. Platinum ware is sold by the gram, in accordance with the current quotation for this precious metal. Platinum crucibles, with covers, weigh approximately as many grams as their capacity in milliliters (ml.). For covers, see No. 8-035.

Capacity, ml	10	15	20	25	30	40	50	60
Diameter, mm	25	30	33	35	42	45	50	55
Height, mm	25	30	33	35	42	45	47	50

Price, per gram, upon application.

8-035. CRUCIBLE COVERS, Platinum, flat style; made to fit Platinum Crucibles No. 8-030.

For Crucible, ml	10	15	20	25	30	40	50	60

Price, per gram, upon application.

8-040. CRUCIBLES, Silver, without covers; made of one piece of pure silver sheet, spun to shape. The capacities given are the amounts the crucibles will hold conveniently. In addition to the general uses, silver crucibles are used as electrodes in electro-chemical analysis. The approximate weight in grams, given below, includes the weight of Covers, No. 8-045, which are usually supplied, but which should be specified separately if desired.

Capacity, ml	20	30	50	75
Diameter, mm	38	42	44	50
Height, mm	35	44	50	56
Approx. weight, with cover	35	45	60	80
Per gram	**$ .11**	**.11**	**.11**	**.11**

8-045. CRUCIBLE COVERS, Silver; flat style, for Silver Crucibles No. 8-040.

For Crucible, ml	20	30	50	75
Per gram	**$ .11**	**.11**	**.11**	**.11**

8-048

8-050

8-055

8-048. CRUCIBLE, Armco Iron, extra heavy, for sodium peroxide fusions in the determination of chromium in high speed tool steels. These crucibles are made from a pure, carbon iron which is practically free from chromium, silicon and manganese, which have an alloying tendency. They are being used for the alkali fusions in alloy steel analysis and are giving better service than the regular iron crucibles. Height, 32 mm.; diameter of top, 38 mm.; capacity, about 25 ml.; without cover. **Each, $ .50**

8-050. CRUCIBLES, Wrought Iron, without covers; made of wrought iron sheet, spun to shape. The capacities given are those that the crucibles will hold conveniently. For covers, see No. 8-055. The 200 ml. size is used in the Conradson Method for the Determination of Carbon Residue of Lubricants, according to the A. S. T. M. *Standard methods for 1924, Serial Designation, D 189-24 T.*

Capacity, ml	20	50	100	200	400
Diameter of rim, mm	38	54	64	80	95
Each	**$ .18**	**.22**	**.30**	**.40**	**.60**

Per dozen, 10% discount. **Per hundred,** 20% discount.

8-055. CRUCIBLE COVERS, Wrought Iron; for Crucibles No. 8-050.

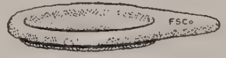
For Crucible, ml	20	50	100	200	400
Each	**$ .09**	**.11**	**.15**	**.18**	**.20**

Per dozen, 10% discount. **Per hundred,** 20% discount.

8-060

8-065

8-070



8-075
See also No. 8-085

8-080

8-060. CRUCIBLES, Silica, Opaque, wide form, without covers. Made of pure fused silica, glazed inside and outside. The coefficient of expansion is $^1/_{17}$ that of glass and will, therefore, withstand sudden temperature changes. These crucibles may be used continuously at temperatures up to 1100° C. They are unattacked by any mineral or organic acid except hydrofluoric acid and phosphoric acid at high temperatures. For covers, see No. 8-065.

*Capacity, ml	4	15	25	40
Diameter of rim, mm	27	41	47	56
Height, mm	19	25	28	36
Each	**$ .65**	**.85**	**1.00**	**1.15**

8-065. CRUCIBLE COVERS, Silica, Opaque; with knob, for Wide Form Silica Crucibles No. 8-060.

*For Crucible, ml	4	15	25	40
Each	**$ .55**	**.60**	**.65**	**.85**

8-070. CRUCIBLES, Silica, Opaque, High Form, without covers; same quality as No. 8-060, glazed inside and outside. This is the platinum-shaped crucible and is used in place of platinum for many purposes. It maintains its weight, does not volatize and is unaffected by reducing flames. For covers, see No. 8-075.

*Capacity, ml	20	30	50
Diameter of rim, mm	35	43	50
Height, mm	35	38	50
Each	**$1.35**	**1.35**	**1.65**

8-075. CRUCIBLE COVERS, Silica, Opaque; flat style, for High Form Silica Crucibles No. 8-070.

*For Crucible, ml	20	30	50
Each	**$ .60**	**.60**	**.65**

8-080. CRUCIBLES, Silica, Transparent, High Form, without covers; made of pure fused silica, having the transparency of glass. These crucibles are insoluble in water and acids, except hydrofluoric acid and phosphoric acid. They withstand high temperatures and severe temperature changes. For covers, see No. 8-085.

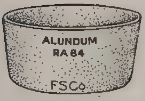
*Capacity, ml	10	20	30
Diameter of rim, mm	27	35	43
Height, mm	31	35	38
Each	**$1.90**	**2.85**	**3.15**

8-085. CRUCIBLE COVERS, Silica, Transparent; flat style, for High Form Transparent Silica Crucibles No. 8-080.

*For Crucible, ml	10	20	30
Each	**$1.60**	**2.05**	**2.40**

**Sizes adopted by the American Chemical Society, Standardization Committee.*

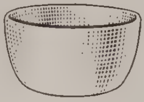
COMBUSTION CAPSULES



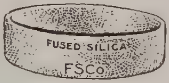
8-090

8-095

8-100



8-105



8-110

8-090. CRUCIBLE, Capsule Form, Alundum; made of Alundum mixture RA-84; used for ignition purposes. Diameter of top, 44 mm.; height, 22 mm.; capacity, about 25 ml. **Each, $ .40**

8-095. CRUCIBLE, Capsule Form, Illium; recommended for use as a combustion pan in the bomb of fuel calorimeters and for any other use where an acid resisting alloy, with properties similar to platinum, is desired in a combustion capsule. Diameter of top, 27 mm.; diameter of bottom, 24 mm.; height, 12 ml. **Each, $4.00**

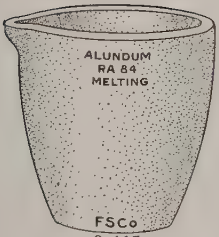
8-100. CRUCIBLE, Capsule Form, Nickel, Kawin, made of pure nickel with heavy walls; used in a muffle for burning off filter paper in the determination of silicon in iron. Diameter of top, 28 mm.; diameter of bottom, 25 mm.; height, 15 mm. **Each, $ .45**

8-105. CRUCIBLE, Capsule Form, Porcelain; used for combustion tests of coal and other material. Diameter of top, 42 mm.; height, 25 mm.; capacity, about 25 ml.; glazed throughout, except the outside bottom surface. **Each, $ .18**

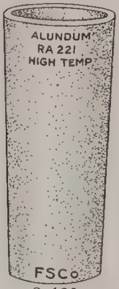
8-110. CRUCIBLE, Capsule Form, Silica, Opaque; made of pure fused silica, glazed inside and outside; used as a low form combustion capsule. Diameter of top, 27 mm.; diameter of bottom, 24 mm.; height, 13 mm. **Each, $ .85**

MELTING CRUCIBLES

8-130



8-115



8-120

8-125

8-115. CRUCIBLES, Alundum, Melting; for experimental work and for melting pure metals, especially those with high melting points. These crucibles should not be used in contact with slags on account of the absorbent nature of the refractory material. The mixture used is known as RA-84. Size C is supplied with a cover; the other sizes are not. *Alundum crucibles for ignitions and fusions, see No. 7-995.*

Size	A	B	C
Diameter of rim, mm	38	60	70
Height, mm	50	65	120
Each	**$1.40**	**1.80**	**3.20**

8-120. CRUCIBLE, Alundum, High Temperature; made of Alundum RA-221, which has a higher melting point than other Alundum ware. This crucible is satisfactory for melting platinum. Diameter of top, 35 mm.; height, 80 mm. **Each, $1.50**

8-125. CRUCIBLES, Plumbago, without covers; made of high quality graphite, with thick walls. To estimate the approximate pounds of metal contained by each size of crucible, multiply the capacity in "pints" by the Specific Gravity of the metal. For covers, see No. 8-130.

Size, No	00	000	0000	1	2	3
Capacity, ml	30	50	125	250	375	500
Diameter of top, mm	47	50	60	80	95	105
Height, mm	56	63	75	90	113	131
Each	**$ .65**	**.65**	**.65**	**.80**	**.90**	**1.10**

Per dozen, 15% discount.

8-130. CRUCIBLE COVERS, Plumbago; for Plumbago Crucibles No. 8-125.

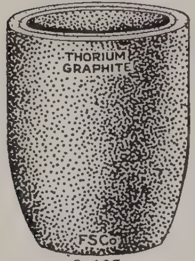
For Crucible, No	00	000	0000	1	2	3
Each	**$ .30**	**.30**	**.30**	**.42**	**.42**	**.42**

Per dozen, 15% discount.

8-150

8-140

8-160



8-135

8-145

8-155

8-135. CRUCIBLES, Thorium-Graphite, High Frequency; these crucibles have been designed to withstand the very high temperatures produced by the high frequency furnaces, and may be used for melting platinum, molybdenum, tungsten, and similar materials requiring temperatures of at least 2500° C. The crucible wall is of graphite with a thorium lining about one-third the thickness of the wall.

The high thermal conductivity of the graphite makes the crucible heat up quickly, while the low coefficient of expansion and chemically inert nature of the thorium permit of many "heats" being made in the same crucible. While these crucibles have been designed primarily for use in high frequency furnaces, they can be used in any other furnace where very high temperatures, and a chemically inert container, are involved.

Size	A	B
Capacity, ml	125	250
Diameter of top, mm	60	80
Height, mm	75	90
Each	**$3.50**	**4.50**

8-140. CRUCIBLE COVERS, Thorium Lined; for Thorium Crucibles No. 8-135.

For Crucible, size	A	B
Each	**$1.50**	**200**

8-145. CRUCIBLES, Melting, Denver Fire Clay, without covers; burned at a high temperature, combining refractory qualities with mechanical strength. These crucibles are used for melting metals, glass, enamels, chemicals, etc. and are well adapted for direct firing in gas and gasoline furnaces. For covers, see No. 8-150.

Size, No	D	E	F	G	J	K	L
Diameter of top, mm	60	75	78	90	110	120	130
Height, mm	100	113	125	140	165	180	200
Quantity per carton	100	75	64	....	....	....	....
Quantity per barrel	450	300	225	140	75	50	40
Per dozen	**$1.56**	**2.28**	**2.52**	**2.88**	**5.04**	**8.64**	**9.60**

Carton lots, 10% discount. **Barrel lots,** 20% discount.

8-150. CRUCIBLE COVERS, Denver Fire Clay; for Melting Crucibles No. 8-145.

Size, No	D	E	F	G	J	K	L
Diameter, mm	60	75	78	90	110	120	130
Per dozen	**$ .96**	**1.32**	**1.80**	**2.04**	**3.36**	**3.72**	**4.80**

Per hundred, 15% discount.

8-155. CRUCIBLES, Assay, Denver Fire Clay, without covers. These are the standard assay crucibles used by mining concerns all over the Western Hemisphere. (*The life of these crucibles is prolonged by protecting them from moisture.*)

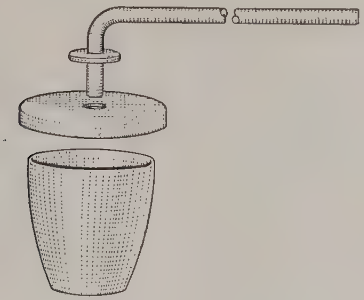
Capacity, grams	5	10	15	20	30
Diameter of top, mm	60	65	70	78	88
Height, mm	65	75	90	95	100
Quantity per carton	200	150	125	100	80
Quantity per barrel	800	500	400	350	250
Per dozen	**$1.20**	**1.38**	**1.68**	**1.80**	**2.04**

Carton lots, 10% discount. **Barrel lots,** 20% discount.

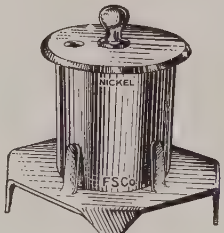
8-160. CRUCIBLE COVERS, Denver Fire Clay; for Assay Crucibles No. 8-155.

For crucible, grams	5	10	15	20	30
Diameter, mm	60	65	70	78	88
Per dozen	**$ .90**	**.96**	**1.08**	**1.32**	**1.98**

Per hundred, 15% discount.



8-165



8-185

8-165. CRUCIBLES, Rose, Porcelain, Unglazed, with cover and inlet tube. The cover fits the crucible loosely and has a 7 mm. hole in the center for the insertion of the inlet tube. The inlet tube is 5.5 mm. diameter and measures 30 mm. from the crucible to the bend and 140 mm. from the bend to the outlet. The whole outfit fits together loosely and is used for heating substances in an atmosphere of gas introduced through the inlet tube.

*Size, No	1	2
Capacity, mm	15	30
Diameter of rim, mm	31	39
Diameter of bottom, mm	16	24
Height, mm	37	43
Each	**$1.15**	**1.26**

8-170. CRUCIBLES, Rose, without cover or inlet tube; for use with No. 8-165.

*Size, No	1	2
Capacity, ml	15	30
Each	**$ .22**	**.32**

8-175. CRUCIBLE COVERS, Rose, with hole in center; for use with No. 8-165.

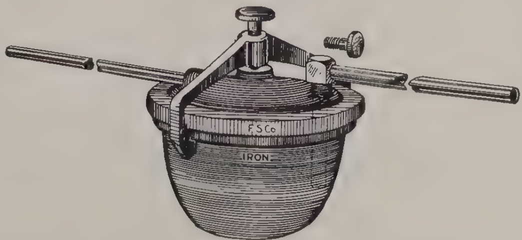
*Size, No	1	2
For Crucible, ml	15	30
Each	**$ .07**	**.08**

8-180. INLET TUBES, Rose, for use with No. 8-165.

*Size, No	1	2
For Crucible, ml	15	30
Each	**$ .86**	**.86**

8-185. CRUCIBLE (Sulphur), Pennock & Martin; used for the rapid determination of sulphur in coal and coke. For method, see *Jour. Amer. Chem. Soc., December, 1903, p. 1265.*

The crucible is of heavy nickel, 38 mm. inside diameter, with a capacity of 40 ml. The cover is made very thick and has in it a hole through which the ignition wire is introduced. The support, into which the crucible fits, is of aluminum. Supplied with cover and support. **Each, $3.00**



8-190

8-190. CRUCIBLES, Skidmore; designed by Prof. S. T. Skidmore, sometimes called Normal School Crucibles; used as an open crucible, a gas generator or a retort. The crucible is made of sheet iron, spun to shape, with reinforced rim. The clamp is of cast iron and the inlet and outlet tubes are of brass. A screw, with knurled head, is supplied to close one of the openings in the cover when the outfit is to be used as a retort.

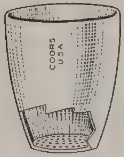
The crucible heats quickly and has a large number of uses in the laboratory including the making of oxygen from $KMnO_4$, calcination of chalk with recovery of the expelled CO_2, preparation of ammonia, destructive distillation of coal, wood, or other organic substances and for any other use in which the materials do not attack iron at red heat. Also used in determining the carbon residue in lubricating and fuel oils, by the Conradson Method. See *U. S. Bureau of Mines, Technical Paper, 323-A, p. 79, 1924;* also A. S. T. M. *Standard Methods for 1924, Serial Designation D 189-24 T.*

Capacity, ml	45	180
Diameter, mm	65	80
Height, mm	38	60
Each	**$1.50**	**2.25**

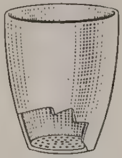
Per dozen, 10% discount.

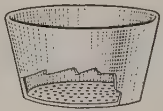
**Sizes adopted by the American Chemical Society, Standardization Committee.*

FILTERING CRUCIBLES


8-195

8-200
See also No. 8-210


8-205


8-215

8-195. CRUCIBLES, Gooch, Porcelain, Coors, without covers; with perforated bottom for filtering; glazed inside and outside except the outside bottom surface. The perforations are about one (1) mm. diameter.

*Capacity, ml	10	25	35
Diameter of top, mm	27	35	40
Diameter of bottom, mm	18	22	25
Each	**$ .21**	**.28**	**.30**

8-200. CRUCIBLE COVERS, Porcelain, Coors; for Gooch Crucibles No. 8-195.

*For Crucible, ml	10	25	35
Each	**$ .06**	**.06**	**.08**

8-205. CRUCIBLES, Gooch, Porcelain, Imported, without covers. The quality is the same as Crucibles No. 7-975, glazed completely inside and outside, with perforated bottoms for filtering. The perforations are about ¾ of one (1) mm. diameter.

Capacity, ml	25
Diameter of top, mm	35
Diameter of bottom, mm	22
Each	**$ .25**

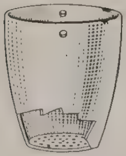
Per dozen, 10% discount.

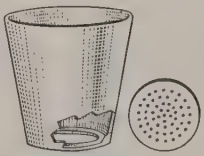
8-210. CRUCIBLE COVERS, Porcelain, Imported; for Gooch Crucibles No. 8-205.

For Crucible, ml	25	35
Each	**$ .05**	**.07**

Per dozen, 10% discount.

8-215. CRUCIBLE, Bitumen, Gooch, Porcelain, without cover; glazed inside and outside except outside bottom which is perforated for filtering. Diameter of top, 45 mm.; diameter of bottom, 35 mm.; height, 25 mm.; capacity, 40 ml. This is the crucible recommended for the Determination of Bitumen in A. S. T. M. *Standard Methods for 1924, Serial Designation D 4-23 T.* **Each, $ .45**


8-220


8-225

8-235

8-220. CRUCIBLES, Extraction, Gooch, Porcelain, without covers; glazed inside and outside, except the outside bottom surface, which is perforated for filtering. These crucibles are made with two holes near the rim and are used for suspending in Extraction Apparatus. The 10 ml. size can be used with the Underwriters' Form, and the 25 ml. size with the Baily-Walker and Wiley Extraction Apparatus.

Capacity, ml	10	25
Diameter of top, mm	27	35
Diameter of bottom, mm	18	22
Height, mm	30	40
Each	**$ .22**	**.30**

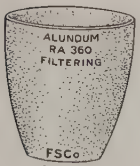
8-225. CRUCIBLE, Caldwell, Porcelain, with separable bottom, perforated for filtering; without cover. This crucible is made with a flange on the bottom which holds a separate perforated disc, 22 mm. diameter. Capacity, 25 ml.; diameter of rim, 39 mm.; outside diameter of bottom, 26 mm.; height, 40 mm.; glazed inside and outside, except outside bottom of crucible and outside bottom of disc.

Caldwell Crucibles will fit Crucible Holders, No. 8-265, No. 8-285 and No. 8-275, Size 2. With disc, but without cover. **Each, $ .41**

8-235. CRUCIBLE, Pyrex-Alundum, Willard Filtering; designed by Prof. H. H. Willard of the University of Michigan; used in filtrations where it is important that the filtrate passes through the bottom only and not through the wall of the crucible. Diameter of top, 38 mm.; height, 40 mm.; capacity, 30 ml.

This crucible is made of heavy Pyrex glass, with an Alundum disc inserted as the bottom of the crucible. The disc is of RA-98 Alundum, which is carefully joined to the Pyrex glass in such a way that the filtrate will pass through the disc and not between the disc and the glass. They are particularly suited for the filtration of chlorine and bromine solutions, but are not recommended for strongly alkaline solutions. **Each, $3.50**

**Sizes adopted by the American Chemical Society, Standardization Committee.*



8-230

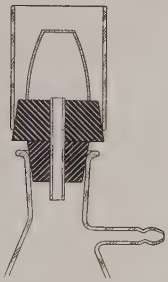
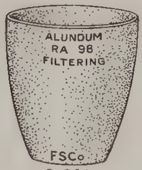


Fig. 1



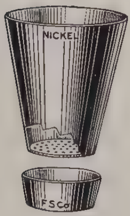
8-231

8-230. CRUCIBLES, Alundum Filtering, medium grain, sufficiently porous for filtering with suction and for holding the finest precipitates; not affected by the solutions of acids or alkalies used in ordinary analytical work; recommended for use in sugar analysis. These crucibles can be dried quickly to constant weight. Under this number we supply crucibles of medium grain which have a medium porosity and are known as RA-360. *For coarse grain, more porous, crucibles, see No. 8-231.* Crucible holder No. 8-280 is recommended for the 25 ml. size. (*To clean an Alundum Filtering Crucible by reverse washing, see Fig. 1.*)

Capacity, ml	25	35
Diameter, mm	35	41
Height, mm	38	43
Each	**$ .35**	**.45**

8-231. CRUCIBLES, Alundum Filtering, coarse grain. These crucibles are similar to No. 8-230 and are used in the same manner but are made of Alundum known as RA-98 which has a coarser grain and are therefore more porous.

Capacity, ml	25	35
Diameter, mm	35	41
Height, mm	38	43
Each	**$ .35**	**.45**



8-240

8-245

8-250

8-255

8-240. CRUCIBLE, Gooch, Nickel, without cover. The bottom of the crucible is perforated for filtering. Diameter of top, 38 mm.; height, 40 mm.; capacity, 30 ml. An extra nickel receptacle, which fits the bottom of the crucible, is supplied to be used when transferring the crucible after ignition. This crucible fits Crucible Holders No. 8-265 and No. 8-285. **Each, $2.60**

8-245. CRUCIBLES, Gooch, Platinum, without covers. The bottom of the crucible is perforated for filtering. An extra platinum receptacle, which fits the bottom of the crucible, is supplied. Because pure platinum is very soft, a small percentage of iridium is added to give the crucibles rigidity and better wearing quality. The crucibles are hammered to shape. Platinum ware is sold by the gram, in accordance with the current quotation for this precious metal. For covers, see No. 8-250. The approximate weights given below include the covers and extra receptacles.

Capacity, ml	20	25	30
Diameter, mm	33	36	39
Height, mm	33	36	39
Approximate weight (see above), grams	24	29	34

Price, per gram, upon application.

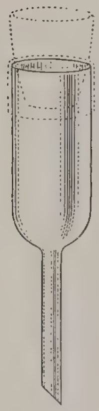
8-250. CRUCIBLE COVERS, Platinum; for Gooch Crucibles, No. 8-245.

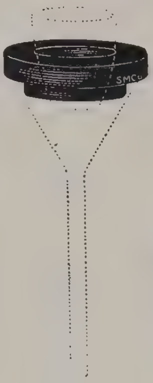
For crucible, ml	20	25	30

Price, per gram, upon application.

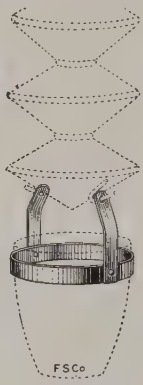
8-255. CRUCIBLE, Gooch, Silica, without cover. This crucible is made of pure fused silica with the wall opaque and the perforated bottom of transparent silica. The crucible is fused together in one piece. One of its uses is for filtering graphite in pig-iron. Diameter of top, 40 mm.; diameter of bottom, 25 mm.; height, 40 mm.; capacity, about 25 ml. **Each, $5.00**

HOLDERS FOR FILTERING CRUCIBLES

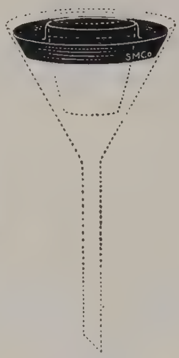

8-260



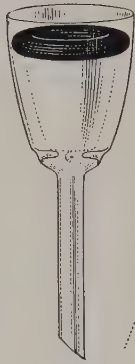
8-265

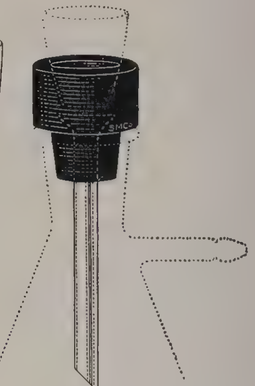


8-270



8-275


8-280



8-285

8-260. CRUCIBLE HOLDERS, Filter Tubes; made of glass for holding Gooch and other filtering crucibles. A tight joint is made by means of a piece of Gooch Rubber Tubing.

The 25 mm. holder takes the 10 ml. porcelain Gooch crucibles, and others of similar size. The 32 mm. holder takes the 25 ml. porcelain and silica Gooch crucibles, also the 25 ml. Alundum, and the No. 8-225 Caldwell Crucibles. The 38 mm. holder takes the No. 8-215 Bitumen Crucible, also the 35 ml. porcelain Gooch, and the 35 ml. Alundum crucibles.

These tubes have stems 75 mm. long, 8 mm. outside diameter, and are ground to a point. Prices are for the holders without crucibles, or rubber tubing.

Diameter, inside top, mm	25	32	38
Length of body, mm	75	75	75
Length over all, mm	150	150	150
Each	**$ .35**	**.45**	**.60**

Per dozen, 10% discount.

8-265. CRUCIBLE HOLDER, Bailey; for holding Gooch crucibles; made of one piece of rubber, to fit the top of an ordinary 2-inch funnel. The wide part of the holder rests on the top of the funnel and the projection rests on the inside of the funnel and supports it when suction is used. This holder accommodates Gooch Crucibles No. 8-195, sizes 25 ml. and 35 ml.; No. 8-205, sizes 25 ml. and 35 ml.; No. 8-215 and No. 8-240.

The rubber part only is supplied under this number. **Each, $ .35**

8-270. CRUCIBLE HOLDER, Fisher. A new holder which makes it possible to use an Alundum Filtering Crucible with an extraction apparatus of the Wiley type. It also holds porcelain Gooch crucibles.

Made of bronze, nickel plated. The supporting clips turn down to allow the crucible to be placed in the holder from the top; the holes in the clips take the hooks on the Wiley condenser.

With this holder, regular 25 ml. porcelain Gooch crucibles can be used, avoiding the necessity of having special crucibles with holes in the sides, also the tedious work of wiring them to the extractor. It is the only holder by means of which 25 ml. Alundum filtering crucibles can be used with the Wiley type of extractors. **Each, $ .60**

8-275. CRUCIBLE HOLDERS, Sargent; for holding Gooch crucibles. Consists of a tapered rubber washer which fits in an ordinary funnel, and has an opening to accommodate the crucible. The feature of this holder is a thin flexible rim on the outside which conforms to the shape of the funnel, and another similar rim around the inside hole which conforms to the shape of the crucible. These flexible rims insure suction-tight joints. The rubber part only is supplied.

Size, No	1	2	3
For crucibles, rim diameter, mm	27	35	40
Each	**$ .35**	**.40**	**.50**

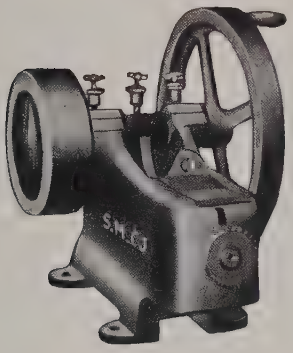
8-280. CRUCIBLE HOLDER, Spencer; for holding Alundum Filtering Crucibles No. 8-230, 25 ml. size. The holder is made of glass with projecting lugs inside to support the crucible, and is provided with a rubber ring which fits inside the holder and rests on the upper edge of the crucible. This makes a suction-tight holder for crucibles similar to Alundum crucibles which are porous throughout. With this holder, all parts of the crucible are accessible for washing. Glass holder with rubber ring. **Each, $ .85**

8-285. CRUCIBLE HOLDER, Walter; for holding Gooch crucibles 25 ml. and 35 ml. sizes. Made of rubber with a glass stem. The wide part of the holder which rests on the neck of a filtering flask, is 47 mm. diameter; the narrow end of the tapered part is 22 mm. diameter. The holder can be used with flasks having diameter of necks within these limits. The rubber holder is supplied with glass stem ground to a point. **Each, $ .60**

CRUCIBLE FURNACES. See Furnaces, pages 363 and 364.

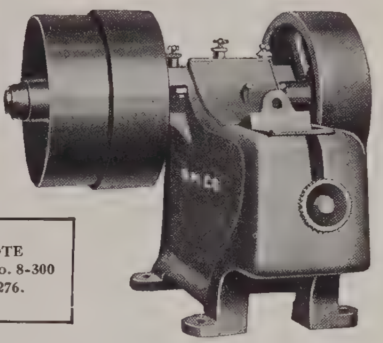
CRUCIBLE TONGS. See Tongs, page 555.

CRUSHERS, GRINDERS AND MILLS



8-290

SEE NOTE
preceding No. 8-300
on page 276.



8-295

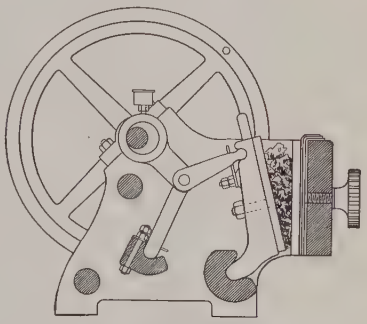
8-290. CRUSHER, Laboratory, Hand or Power. These jaw-crushers have been installed in many laboratories, especially in the Pittsburgh District, where they have been subjected to very hard use and have given satisfactory service over a period of years. This Crusher fulfills the requirements of strength, capacity, convenient operation and durability.

Construction. The frame and housing of this crusher are made in one solid casting which has been designed with reinforcing at the places where the greatest strain occurs; this eliminates the annoyance of having bolts and nuts work loose in operation. The shaft and bearings are in front of the crushing jaws (not over them) and are completely enclosed so that they are protected from the grit from the crusher.

Three grease cups keep the bearings thoroughly lubricated and make the lubrication so convenient and simple that it is usually attended to.

The jaw faces are plates of very hard and tough alloy steel; they are rectangular, 3x6 inches, are bolted at the center so that when one end becomes worn, they can be reversed and in this way each face will give double service.

Operation. The cross-section illustration shows the angle of the jaws when open; the crushing space is larger at the top and the travel of the top of the moving jaw is greater than at the bottom. Pieces of ore, or similar material, as large as 3x2½ inches, can be introduced and as these are crushed they fall to different levels, depending on their size, and are again crushed; this is repeated until all of the material is fine enough to pass out the small opening at the bottom.



Cross-section of No. 8-290

Three replaceable liners are furnished. These can be slipped in back of the stationary jaw to advance it so as to crush to different degrees of fineness as desired.

This machine will reduce 50 to 150 pounds of 2½-inch soft rock to about 10 mesh in one hour, the actual capacity varying with the nature of the material.

This Crusher should not be confused with a Pulverizer; crushing and pulverizing are two separate operations and where it is desired to reduce large pieces to a very fine mesh, the product of this machine is put through the Pulverizer No. 8-300.

A feature of this machine is the ease with which it is cleaned. (*See illustration.*) A turn of the large hand bolt loosens the stationary jaw and it is simply lifted out and brushed off; the movable jaw is lifted to a horizontal position, by the handle provided for this purpose, and is brushed off. This is very convenient for laboratory work where the crusher is used to prepare different samples for analysis. Spare parts for this crusher can be supplied, if desired.

Specifications. The space required is 14½ by 21 inches; holes are provided for attaching permanently to a bench beneath which the receiver can be placed. The hand wheel is 16 inches diameter and the belt pulley is 9 inches diameter with a 2¾-inch face; the jaw faces are 3x6 inches and the jaw opening 3 x 2½ inches. If used for power drive, a one (1) H.P. motor should be used and the crusher operated at from 450 to 500 r.p.m. Net weight, 140 pounds; shipping weight, about 165 pounds.

Each, $95.00

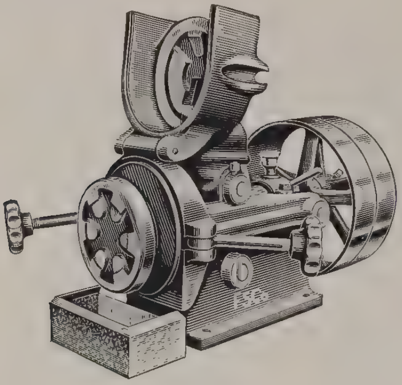
8-295. CRUSHER, Laboratory, for Power. The design of this crusher, also method of operation, is similar to No. 8-290 and it has all of the features mentioned under that number, but it is larger and stronger, has a greater capacity and is adapted for heavier work. It is used by the larger metallurgical laboratories.

This crusher is operated by power only and has a tight and loose pulley; the loose pulley is slightly smaller so that the belt strain is taken off the bearing of the crusher when it is not being used. This crusher with Pulverizer No. 8-310, makes an equipment of large capacity for reducing pieces up to 3 by 4 inches to a very fine mesh.

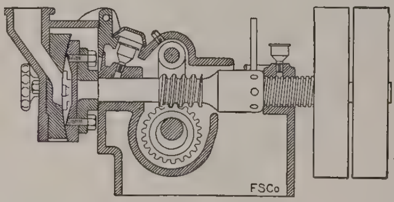
Specifications. The space required is 27 by 28 inches; the tight pulley is 14 inches diameter with a 4-inch face; the jaw faces are 4½ by 10¾ inches and the jaw opening is 3¼ by 4½ inches. A 2 H.P. motor should be used and the crusher operated at about 400 r.p.m. Net weight, 540 pounds; shipping weight, about 660 pounds.

Each, $185.00

DISC PULVERIZER



8-300
Opened for cleaning



Cross-section of No. 8-300

The reduction of large pieces of materials with a crystalline structure to a very fine mesh involves two separate operations and requires two different types of machines. The material is first put through a Crusher and then through a Grinder or Pulverizer. (See page 275.)

The reduction of materials with a fibrous structure requires a machine which tears as it grinds; such machines are usually called Grinding Mills. (See pages 281 to 283 inclusive.)

The machines illustrated and described have been selected to provide the means of preparing laboratory samples of a wide range of different materials.

8-300. PULVERIZER, Laboratory, with 6-inch discs. This machine takes material as coarse as ½-inch cubes and grinds and pulverizes it to any fineness desired from 10 to 200 mesh. Where the material at hand is larger than ½-inch cubes, it is first put through Crusher No. 8-290, and then through this Pulverizer.

Construction. The frame and main housing are cast in one piece. The discs are heat treated, cast iron of a special composition, 6 inches diameter; the moving disc is convex and the stationary disc is concave. The faces of the discs have teeth at the centre and are smooth at the outer edges.

The rotating disc is attached to the drive shaft and the shaft moves slowly up and down so that there is a slight change of the position of the rotating disc with each revolution; this prevents scoring or concentrical grooving of the discs.

The machine can be cleaned by simply loosening the two large hand bolts and swinging out the end carrying the stationary disc; both discs can then be brushed off.

An adjustment is provided for moving the discs closer together which produces finer grinding.

Operation. The material feeds into the centre of the discs and is ground by the teeth on the discs at this place. As it is reduced it moves toward the edges and is further reduced until it passes out between the smooth edges.

By adjusting a small lever, which can be done while the machine is in operation, a portion of the sample can be ground to 50 mesh, a portion ground to 100 mesh and the remainder ground to 200 mesh, or any other degrees of fineness desired.

If desired, the machine can be set to yield the fineness desired and the adjustment locked so that the entire sample, and succeeding samples, will be ground to the same fineness. The grinding discs are readily replaced.

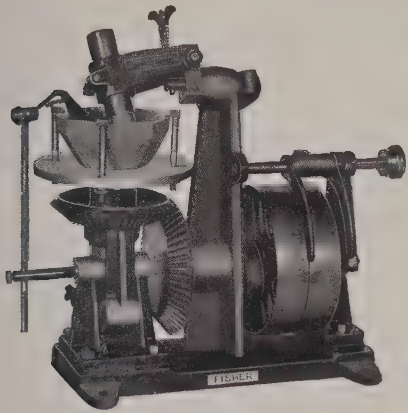
Specifications. The length of the machine is 24 inches; width, 11 inches; height, 11 inches. Discs are 6 inches diameter; tight and loose pulleys are 10 inches diameter with 2¼-inch faces. Speed, 650 to 850 r.p.m.; requires one (1) H.P. to operate. Weight of machine, 130 pounds; shipping weight, 150 pounds. Capacity, 25 pounds per hour to 100 mesh and greater for coarser meshes. **Each, $120.00**

8-305. EXTRA GRINDING DISCS, for Pulverizer No. 8-300. To replace discs supplied with the machine which may have become worn after long service. **Per pair, $9.50**

8-310. PULVERIZER, Laboratory, with 9-inch discs. The design of this Pulverizer, also method of operation, is similar to No. 8-300 and it has all of the features mentioned under that number, but it is larger and stronger and has a greater capacity. Where a large quantity of material is to be reduced from pieces larger than ¾-inch cubes to a very fine mesh, this Pulverizer is used for reducing the product of Crusher No. 8-295.

Specifications. The length of the machine is 25 inches; width, 15 inches; height, 14½ inches. Discs are 9 inches diameter; tight and loose pulleys are 14 inches diameter with 2½-inch faces. Speed, 450 to 600 r.p.m.; requires 2 H.P. to operate. Weight of machine, 300 pounds; shipping weight, 350 pounds. Takes pieces up to ¾-inch cubes; capacity, 50 pounds per hour to 100 mesh and greater for coarser meshes. **Each, $175.00**

8-315. EXTRA GRINDING DISCS, for Pulverizer No. 8-310. To replace discs supplied with the machine which may have become worn after long service. **Per pair, $15.00**



8-320

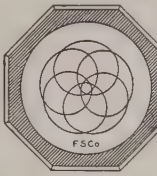
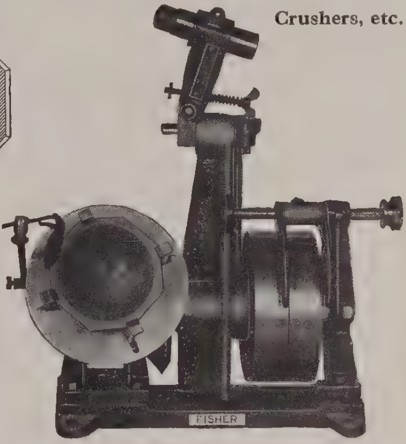


Fig. 1



No. 8-320 Tipped for cleaning

8-320. MORTAR GRINDER, Fisher. A machine which grinds a sample in a mortar more quickly, more thoroughly, without effort on the part of the operator and does not spill the material over the sides. It not only prepares the sample in less time, but it runs without attention so that the operator's time and attention can be applied to other work. It will grind any materials softer than agate which are not gummy or fibrous.

Uses. This machine is used extensively for preparing coal samples for calorific tests and for the different analyses. It will grind samples of a very large variety of materials, such as

Ores
Clays
Cements
Chemicals
Carbons
Hard Metals
Coals
Coke
Ash
Clinker
Dolomite
Brittle Resins
Pigments
Rocks
Glasses
Enamels
Soils
Refractories
Lime Stone

Design. We designed and built this machine to meet the demand for a labor saving device, for grinding laboratory samples which would fulfill all the requirements. These requirements were that the machine should be strong and substantial; moving parts directly driven without belts; pestle should travel over the entire grinding surface and in different paths; varying pressures on the pestle; contents should not spill; everything about it should be adjustable; the mortar should be emptied and cleaned without unclamping; liability of contaminating the sample eliminated and it should sell for a reasonable price. After building, trying out and improving four different models, this machine was developed. Just how it complies with the requirements will be seen from the following description.

Construction. The base plate and the main pillar is one strong casting; the pestle is moved from side to side by an eccentric on the main shaft; the plate holding the mortar is directly driven by beveled gears. The entire construction of the grinder is that of a substantial and compact machine for shop use. Its weight is 60 pounds. All the driving parts are below the mortar so that no oil or grease from these can get into the sample.

Operation. The pestle moves back and forth across the mortar and the mortar revolves at the same time. As a result of these two motions, grinding is done in all parts of the mortar. **Fig. 1** shows one path that the pestle can be made to describe in one (1) cycle of 6 revolutions of the mortar. This is just one of many paths that the pestle can be made to describe. The connecting rod for operating the pestle can be adjusted, by means of a slot in the arm, so that the pestle will move in a long or a short path. The position of the pestle can be adjusted from side to side so that its path of motion will cross either side of the centre at any point desired. Each combination of these adjustments together with the revolution of the mortar, causes the pestle to describe a different path on the grinding surface of the mortar. The pestle is clamped down and a spring on this clamp exerts a pressure on the pestle; this pressure can be increased or decreased, by adjusting the screw, just as one varies the pressure in hand grinding.

Four clamps hold the mortar on the plate; these are adjustable for different heights and by means of the slots, the clamps can be adjusted to take mortars from 80 mm. to 130 mm. outside diameters.

The grinder is started or stopped by means of the belt shifter operated from the side.

A Scraper is provided; the face of this is the same shape as the sides of the grinding surface of the mortar. This scraper can be adjusted for height and angle and it is set so that the material is pushed toward the centre as the mortar revolves; a spring of the proper tension, keeps the scraper in contact with the mortar at all times.

Cleaning. After the sample has been ground, the pestle holder is raised, a butterfly nut is loosened and the plate holding the mortar is tilted forward to a vertical position (as illustrated), the contents emptied and the mortar brushed out. It is then returned to its operating position and fastened. This is done without unclamping or removing the mortar or pestle.

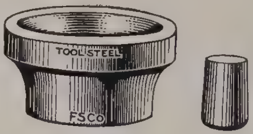
Specifications. The bench space required is 14 by 8 inches; height, 14 inches; four holes are provided for permanently attaching. The tight pulley is 7 inches diameter with a 1½-inch face; the loose pulley is slightly smaller in diameter to relieve the belt tension. Requires ⅛ H.P. to operate; speeds from 40 to 60 r.p.m. of the driving pulley. Weight of machine, 60 pounds; shipping weight, 75 pounds.

The United States Bureau of Mines, Fuel Testing Laboratory, has used one of these machines for six years, during which time it has run almost every day and has ground many thousands of samples. This hard and constant use has worn out one agate mortar and two agate pestles, but the machine is still in good condition.

Price of the No. 8-320 Fisher Mortar Grinder, without mortar or pestle. **Each, $95.00**

(For Mortars, see No. 8-325, No. 8-330 and No. 8-335.)

8-325
See also No. 8-330



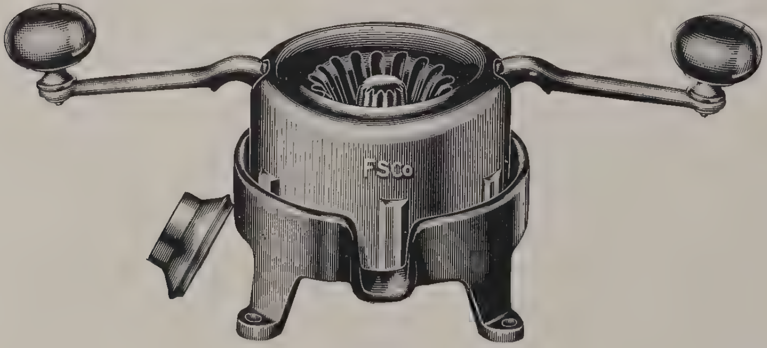
8-335

8-325. AGATE MORTAR AND PESTLE, for Fisher Grinder No. 8-320. A thick and heavy mortar made for use with this machine, cut from selected agate. The grinding surface has the proper curvature for this use and the grinding face of the pestle corresponds; the taper of the pestle fits the holder.

The mortar is octagonal 120 mm. across, and 130 mm. measured along a diagonal. The inside grinding surface is 100 mm. diameter. **Mortar and Pestle, $31.50**

8-330. AGATE MORTAR AND PESTLE, for Fisher Grinder No. 8-320. Similar to Mortar No. 8-325, but smaller; it is 100 mm. outside, measured from side to side and the other dimensions are in proportion. **Mortar and Pestle, $21.00**

8-335. TOOL STEEL MORTAR AND PESTLE, for Fisher Grinder No. 8-320. Made of a high grade of tool steel then heat treated. It is exceedingly hard, although not as hard as agate, it is not so brittle and has a high degree of toughness which adds materially to its resistance to abrasion. We put these mortars on the market seven years ago, when agate mortars were not available, and many laboratories are using them with satisfaction; some prefer them to agate. The mortar is 100 mm. outside diameter and the grinding surface of the pestle is 30 mm. diameter. **Mortar and Pestle, $22.50**



8-340

8-340. CRUSHER, F. S. Co., Weatherhead Type, of heavy chilled iron. For reducing small lumps of ores, rocks, pig iron, coal, clay and minerals to a medium fine powder.

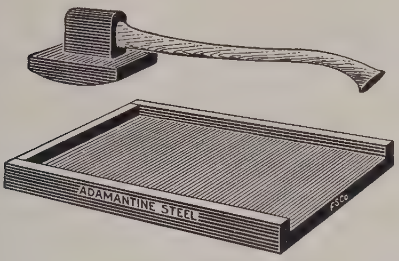
The body is a heavy iron mortar 10½ inches outside diameter and has a tapering boss with grinding teeth, projecting from the center. This is mounted on four legs which have screw holes for permanently attaching to the floor or a low bench. The grinding-head is ring-shaped, 9 inches outside diameter, 2½ inches smallest inside diameter, 6 inches high and weighs 75 pounds. All of the working surfaces are chilled.

The material is introduced at the center and is crushed between the teeth on the inside of the grinding-head and those on the stationary boss. It then passes down and is further reduced by the sides and finally by the rubbing of the bottom of the heavy grinding-head and is then passed out of the mortar through the opening on the side. The cast iron cover prevents material from leaving the crusher at the top.

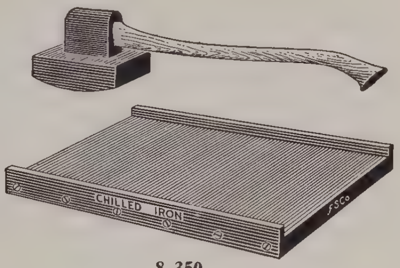
The grinding-head is rotated by two lever-arms with wooden handles attached and is of sufficient weight to grind without additional pressure. The handles can be detached when the machine is not being used. **Each, $37.50**

SATISFACTION OR REFUND

Every item in this catalogue is offered on the basis that if it is not entirely satisfactory it may be returned promptly and the full purchase price will be refunded.



8-345



8-350

8-345. CRUSHER, Adamantine Steel, Plate and Rubber, "Bucking Board." The steel in this plate and rubber is a special acid, open-hearth chrome steel, of a balanced analysis. It has been developed after many experiments and long experience. Its extreme hardness is only one of the properties which combine to make its wearing qualities. It is the only plate we know of for grinding coke samples without liability of the metal grinding into the sample. It is recommended for crushing and grinding iron ore, coke and other hard materials and has been adopted by the Chemists' Committee of the U. S. Steel Corporation in their "Uniform Methods." The combined hardness and toughness of the Adamantine steel makes it resist the abrasive action of hard and sharp materials.

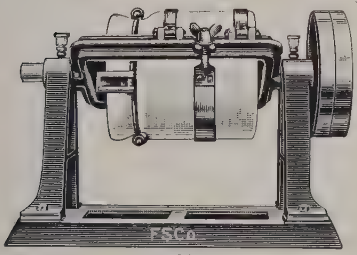
The plate is 18 by 24 inches, has a rim around three sides and weighs about 115 pounds; the rubber is 7 by 8 inches, weighs about 30 pounds and has a wooden axe-handle 26 inches long, which gives the proper leverage. **Plate and Rubber with handle, $120.00**

8-350. CRUSHER, Chilled Iron, Plate and Rubber, "Bucking Board." The plates are heavy and have rims on the sides; the plate and rubber are chilled iron; used for crushing and grinding materials except those which are extremely hard or abrasive.

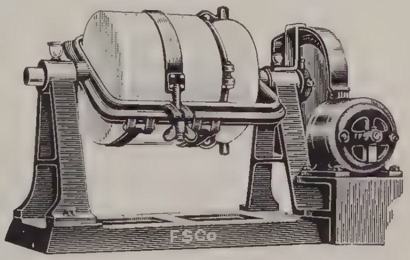
Made in two sizes; supplied with rubbers with wooden handles 26 inches long. The rubber is very heavy (45 pounds) so that it will crush and grind of its own weight without the exertion of bearing down on it.

Size, inches	18x24	24x36
Weight of plate, lbs	75	180
Each (complete)	$22.00	35.00

8-355. EXTRA RUBBER, Chilled Iron, for Crusher No. 8-350. Size, 6 by 8 inches; weight, about 45 pounds; can be used with either size plate; supplied with wooden handle 26 inches long. **Each, $6.00**



8-360
See also No. 8-370



8-365

8-360. BALL MILL, Single, Porcelain Jar, for Power, with tight and loose pulleys. A very practical and useful means of reducing chemicals, coal, coke, sand, pigments and a great many other materials handled in the laboratory, to a very fine powder or flour. There is no danger of contamination as the operation is performed in a sealed porcelain jar with flint pebbles. The jars are nitrous and impervious; colors, dyes and inks can be ground without discoloration of the jar.

Materials can be ground in the dry or wet state; in fact, the grinding is more effective in the wet state. The solids in a mixture with liquids (such as paints) can be ground without first separating them.

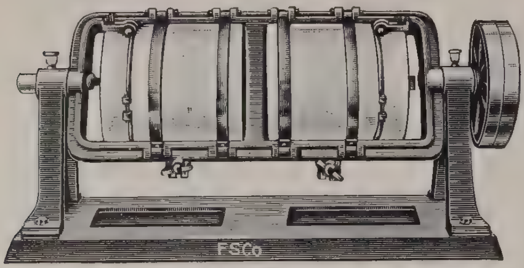
Specifications. Floor space required, 14 by 25 inches; height, 19 inches; outside dimensions of porcelain jar, 8¾ by 9¾ inches; capacity of jar, one (1) ounce to 5 pounds of sand or the equivalent bulk of other materials, or one (1) gallon of wet material; size of hand-wheel, 9 by 1 inches; most effective speed, 60 to 75 r.p.m.; shipping weight, 125 pounds. Supplied with a charge of 8 pounds of flint pebbles.

This power driven machine is recommended as it can be started and allowed to run for a period of time without any attention. **Each, $50.00**

8-365. BALL MILL, Single, Porcelain Jar, with Motor. Mill No. 8-360 with a 110-volt motor (*specify whether A.C. or D.C.*) mounted on a frame connected to the mill, with drive through worm gear to reduce the speed. This is a complete unit to be used where a drive shaft or a separate motor is not at hand.

Supplied with a charge of flint pebbles. **Each, $115.00**

8-370. BALL MILL, Single, Porcelain Jar, Hand Power, with tight pulley and handle. Mill No. 8-360 without the loose pulley and with a handle for turning; can be used where the requirements of the machine are not great. Supplied with a charge of flint pebbles. **Each, $45.00**



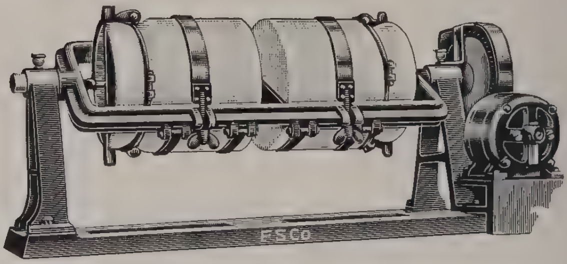
8-375
See also No. 8-385

REGARDING BALL MILLS

The efficiency of this method of reducing materials to the finest powders, which by other methods would be tedious or difficult, is rather astonishing to those who have not previously used a Ball Mill.

FOR PEBBLES AND BALLS

See No. 8-395, No. 8-400 and No. 8-412



8-380

8-375. **BALL MILL, Double, Two Porcelain Jars, for Power,** with tight and loose pulleys. This mill is similar to No. 8-360 except there are two of the same size jars mounted on one frame.

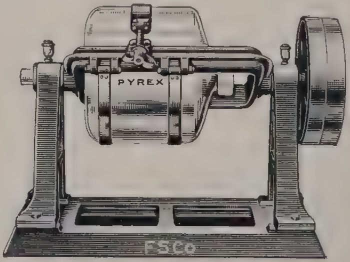
The capacity is double that of No. 8-360, or two separate samples can be prepared at the same time. The floor space required for this machine is 14 by 35 inches. Supplied with two jars and two charges of flint pebbles. **Each, $75.00**

8-380. **BALL MILL, Double, Two Porcelain Jars, with Motor.** Double Mill No. 8-375 with a 110-volt motor (*specify whether A.C. or D.C.*) mounted on a frame connected to the mill, with drive through worm gear to reduce the speed. Supplied with two jars and two charges of flint pebbles. **Each, $140.00**

8-385. **BALL MILL, Double, Two Porcelain Jars, Hand Power,** with tight pulley and handle. Mill No. 8-375 without the loose pulley. Supplied with two jars and two charges of flint pebbles. **Each, $75.00**

8-390

8-405



8-410

8-390. **PORCELAIN JAR.** Size, 9¾ inches high and 8¾ inches outside diameter, for use with Mills No. 8-360 to No. 8-385 inclusive. Jar with cover, gasket and metal fittings, without pebbles. **Each, $17.50**

8-395. **FLINT PEBBLES, for use in Ball Mills.** Jar No. 8-390 requires 8 pounds for a charge.

Size	Small	Large
Approximate diameter, inches	½ to 1	¾ to 1½
Per pound	**$ .15**	**.15**

8-400. **PORCELAIN BALLS, for use in Ball Mills.**

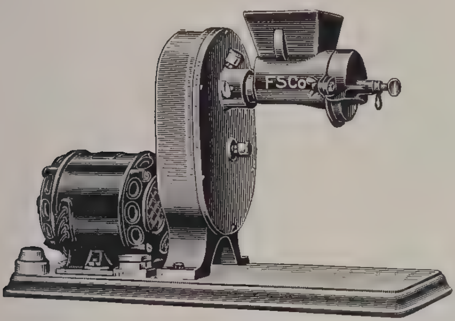
Diameter, inches	½	¾	1	1½
Per pound	**$ .90**	**.85**	**.75**	**.45**

8-405. **BACTERIA GRINDING JAR, Pyrex;** can be mounted in Mills No. 8-360 to No. 8-385 inclusive, and used for grinding bacteria, manufacture of Lipovaccines, in the preparation of Typhoid, Pneumococcus and for experimental work on Meningococcus, Cholera and Plague. Made of heavy, Pyrex glass, with rounded corners, 9½ inches high, 9 inches outside diameter. **Each, $12.20**

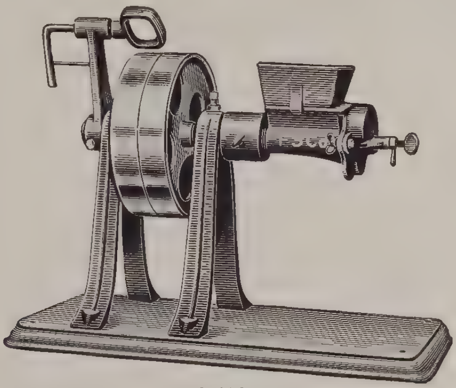
8-410. **BALL MILL, Bacteria, Pyrex Jar.** Mill No. 8-360 for power drive, but equipped with No. 8-405 Pyrex Jar instead of the Porcelain Jar. **Each, $50.00**

8-412. **STEEL BALLS, for use with No. 8-410 Mill or Jar No. 8-405.** Made of high carbon chrome alloy steel.

Diameter, inches	⅜	½
Per hundred	**$3.00**	**6.00**



8-415



8-445

8-415. GRINDING MILL, General Laboratory, Electric. A mill that is almost universal in its application to the different grinding and mixing requirements in the laboratory.

The motor and the gear housing are mounted on a substantial base which eliminates vibrations while the grinder is operating.

The mill proper is supported by the cast iron housing at a height which allows a receptacle to be placed under the discharge outlet. The grinding units are interchangeable and can be inserted as shown in the illustration. There are two grinding units, one for dry grinding and the other for wet grinding.

The Dry Grinding Unit consists of a set of two coarse grinding plates designed for the cutting or disintegrating of fibrous materials including various hard seeds, roots, herbs, etc., as well as more brittle and hard substances such as ores. A toothed feed-worm is used with this grinding unit; this crushes and passes the material on to the plates.

The Wet Grinding Unit consists of two finer grinding plates and a smooth feed-worm which passes all wet, semi-moist or oily substances on to the plates. This unit will handle a wide range of different soft materials including soaps, creams, greases, etc.

Mixing Unit. A separate mixing unit can be supplied with this mill. This is interchangeable with the grinding unit and consists of a special two-way-tapered single blade which effects a most thorough mixing of small batches of material for analysis or for laboratory experiments. (See No. 8-440.)

The Grinding Units are inexpensive, and in laboratories where certain materials are to be ground from time to time, a separate grinding unit can be set aside for use with each of these materials and the liability of chemical contamination eliminated.

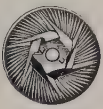
The Grinding Units are easily removed for cleaning by simply removing two small thumb nuts, lifting off the end and removing the revolving grinding plate.

Specifications. Motor has a ¼ H.P. capacity and is usually supplied for use on the ordinary 110-volt alternating lighting circuit; it can be supplied for use on other currents when so ordered.

The Grinding Discs are 4 inches diameter; capacity, 15 to 40 pounds per hour; fineness of product, 75 to 100 mesh. Base, 27 inches long by 12 inches wide; weight including motor, 150 pounds.

Grinding Mill No. 8-415 is supplied with a dry grinding unit and an extra set of grinding plates; push-button switch; plug receptacle; 12 feet of cord with screw-plug; for 110-volt alternating current, unless otherwise ordered.
Each, $139.00

8-420



8-425

8-430

8-435

8-420. GRINDING PLATES, Coarse, for use in Grinding Mill No. 8-415, for coarser dry materials.
Per set, $3.00

8-425. GRINDING PLATES, Fine, for use in Grinding Mill No. 8-415. When wet materials are to be ground, feed-worm No. 8-435 is used in connection with these plates. These same plates can be used for grinding fine dry materials, in which case, feed-worm No. 8-430 is used.
Per set, $3.00

8-430. FEED-WORM, with teeth, for dry materials, for use in Grinding Mill No. 8-415 .... **Each, $2.50**

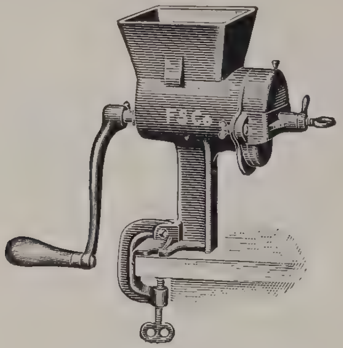
8-435. FEED-WORM, Smooth, for wet materials, for use in Grinding Mill No. 8-415.... ....**Each, $2.50**

8-440. MIXING UNIT, for Grinding Mill No. 8-415..**Each, $10.00**

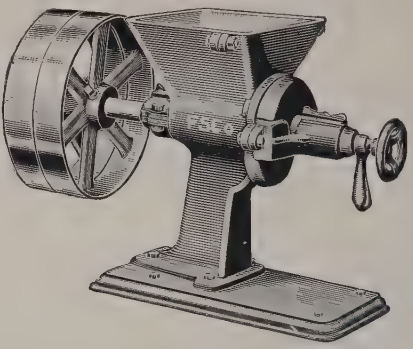
8-445. GRINDING MILL, General Laboratory, Pulley Driven. This mill is similar to No. 8-415, except that it does not have the motor and the connecting gears, but has a pulley to be driven by a belt. Speed of operation, 90 to 200 r.p.m.; power required, ¼ H.P.; supplied with tight and loose pulleys and belt-shifter.
Mill, with a dry grinding unit. **Each, $60.00**

Extra parts No. 8-420 to No. 8-440, inclusive, fit this Mill.

Crushers, etc.



8-450



8-460

8-450. GRINDING MILL, Hand Power. A small and inexpensive mill with a wide range of application in preparing laboratory samples. It has a capacity up to 10 pounds per hour depending upon the material.

It is tinned all over, is supplied with a grinding unit for dry materials and will grind a large variety of crystalline chemicals such as ammonium carbonate, copperas, nickel salts, etc.; also minerals, coals, ores, clays, etc. It will grind roots, seeds, barks, gums and a large variety of different drugs.

It can be equipped with a special grinding unit for wet materials. (See No. 8-455.)

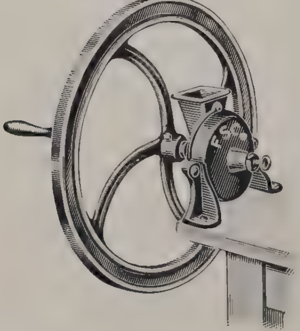
The handle should be turned at about 30 to 50 r.p.m.; the height of the grinder is 11 inches above the table; the weight, crated, is 16 pounds. Provided with a clamp for attaching to the edge of a laboratory table or desk; it is easily detached and set aside when not being used. **Each, $11.50**

8-455. GRINDING UNIT, for Wet Materials, for Grinding Mill No. 8-450; consists of a special feed-worm and a pair of finer grinding discs, by means of which all kinds of wet, semi-moist, oily or greasy materials can be ground. **Complete unit, $5.00**

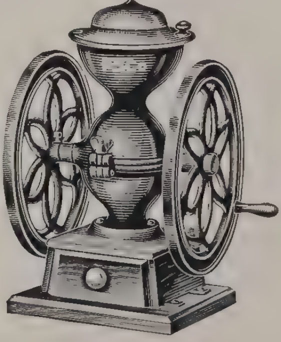
8-460. GRINDING MILL, Power Drive. A mill equipped to grind all the dry materials mentioned under No. 8-450. It is larger and heavier, is designed to be operated by power, and has a capacity of **50 to 100 pounds per hour.** By using the Wet Grinding Unit No. 8-465, it can be employed for wet materials.

Bench space required, 26 by 14 inches; height, 18 inches; speed, 175 to 250 r.p.m.; tight and loose pulleys 12-inch diameter; 3-inch face; power required, one (1) to 1½ H.P.; weight, 125 pounds. **Each, $65.00**

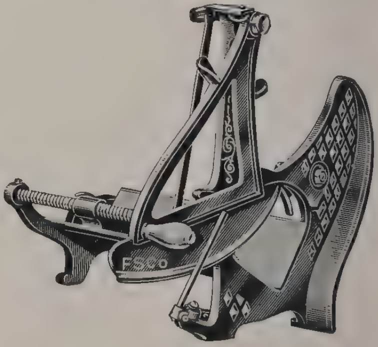
8-465. GRINDING UNIT, for Wet Materials; for Grinding Mill No. 8-460. Consists of a special feed-worm and a pair of finer grinding discs, by means of which all kinds of wet, semi-moist, oily or greasy materials can be ground. **Complete unit, $10.00**



8-470



8-480



8-485

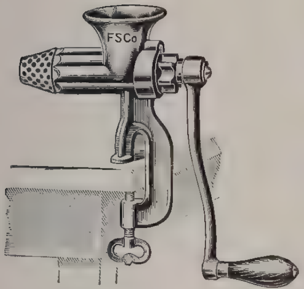
8-470. GRINDING MILL. A small and inexpensive mill for preparing laboratory samples of ores and similar materials. It can be bolted to the edge of a laboratory table. The grinding plates are hard and can be easily replaced when worn out. The large hand wheel, 19½ inches diameter, makes it very easy to operate. Weight of mill, 25 pounds. **Each, $18.00**

8-475. EXTRA GRINDING PLATES, for Mill No. 8-470. .... **Each, $ 5.00**

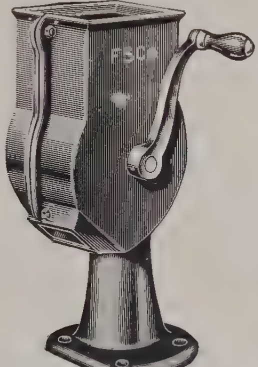
8-480. GRINDING MILL, Laboratory, for grinding drugs, herbs, roots, seeds grains, food products of a fibrous nature and other dry substances. The Mill can be adjusted to grind to different degrees of fineness.

It will grind a ½-pound sample in about one (1) minute, depending upon the nature of the material and the degree of fineness. The Mill is substantially built of cast iron; has two wheels, each 10¾ inches diameter; is 15 inches high over all and weighs 22½ pounds. **Each, $13.00**

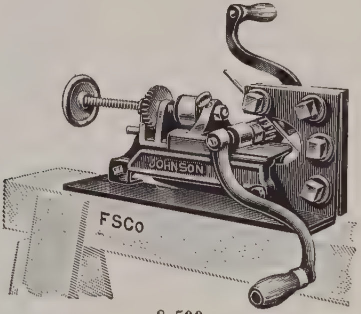
8-485. CUTTER, Laboratory, for cutting bagasse, roots, plants, barks and similar fibrous materials, for extracting vital principles; for cutting fruits and vegetables for dehydration and desiccation; for cutting tobacco for determination of nicotine content, etc. The knife swings on a pendulum-like holder and an automatic feed regulates the size of the cut. This can be adjusted to cut as fine as tissue paper or other thickness up to ⅛ inch. It does the work uniformly and in less time. **Each, $25.00**



8-490



8-495



8-500

8-490. **GRINDER AND CHOPPER.** A small and inexpensive machine which can be clamped to the edge of a laboratory table and used to grind meat for the preparation of culture media; for preparing samples of foods and for shredding beets in sugar laboratories.

The machine is built in practically two pieces, so that it is easily taken apart and cleaned. Made of cast iron, tinned to prevent rusting. Capacity, 2 pounds per minute; weight of machine, 5¼ pounds. **Each, $5.00**

8-495. **CRUSHER, Ice.** A strong and substantial machine which cuts rather than crushes the ice so that the product is a lot of clean-cut pieces with practically no snow ice. The cutting is done by a row of stationary cutters and a series of diamond-point cutting picks attached to the revolving cylinder. These picks cut at the points and along their sides so that there are no lumps remaining. It operates quickly and with very little effort.

The housing is two castings, bolted together; the bearings are die cast, babbitt metal and are easily replaced; the bench space required is 10 by 12 inches; height, 19 inches; weight, 50 pounds. The ice opening at the top is 6 by 6 inches; the product is from the size of a pea to that of a chestnut; the capacity is 15 to 20 pounds per minute and the machine is finished in gray enamel paint. **Each, $20.00**

8-500. **SAMPLE MILLING MACHINE, Johnson;** provides a convenient and quick method of obtaining samples for analysis of metal sheets, wire, saw blades, knife blades, razor blades, bands, nails and other small or irregular shaped articles. The millings from this machine are just the proper mesh for direct carbon combustions. It mills copper very readily and provides an easy means of preparing the large sample of copper wire required for the oxygen determination.

Operation. The piece to be sampled is clamped in the vice; if fine wire, a number of strands are first twisted together; if thin sheets, they are cut, held together in the vice and a cut made of the edges. If the article is stiff, like a rod, it can be clamped at one end. If not, it can be clamped at both ends.

The machine is operated by the handles without much effort. An automatic feed advances the cutter as the machine operates, but, if desired, the action of the feed can be hastened by turning the screw.

As the material is cut it is caught on a small piece of cardboard. The cutter can be sharpened from time to time and new cutters can be supplied as desired. We have installed these machines in many Metallurgical Laboratories; a large number of them are being used in the Pittsburgh District.

Machine with a set of two milling cutters; one fine and one coarse. **Each, $67.50**

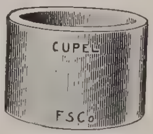
8-505. **MILLING CUTTERS,** for Milling Machine No. 8-500, either fine or coarse .... **Each, $6.50**

CULTURE APPARATUS. See Anaerobic Apparatus; Dishes; Flasks, Test Tubes, etc.

8-510. **CUPELS, Composition;** used in assay work; made of materials which absorb lead oxide readily. The cupels are extremely hard when cold, but become very soft and absorbent when heated.

Size	A	B	C
Diameter, inside, inches	1¼	1½	2
Lead Oxide absorption power, grams	20	30	75
Per dozen	**$ .70**	**.80**	**1.15**
Per hundred	**$4.00**	**4.85**	**7.00**

1000 lots, 10% discount.



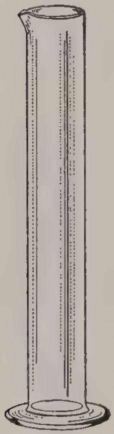
8-510
See also No. 8-515

8-515. **CUPEL MACHINE, Foot Power.** This machine is operated by a foot lever which allows the operator the free use of both hands. The moistened bone ash is placed in the machine at the top; the foot pedal is pressed and the operation is complete. The density and thickness of the cupel are regulated by one set-screw on the pedal. All dies and bushings are made of brass and are easily and quickly changed. The machine is built to be operated in connection with a table 36 inches high. (*Table not supplied.*)

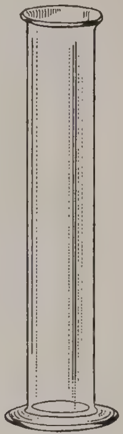
Type No	1	2
To make Cupels, inches diameter	1¼–1½	1¼–1½–2
Each	**$35.50**	**50.00**

CUPEL BONE ASH, for making cupels. See Bone Ash, in the Reagent List in the rear of this catalogue.

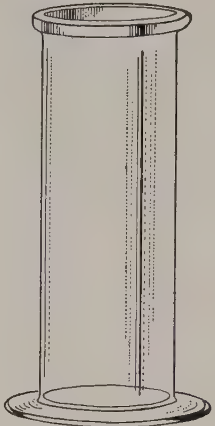
CYLINDERS



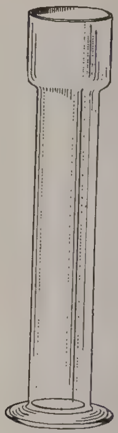
8-530



8-535



8-540



8-545

8-530. CYLINDERS (Hydrometer Jars), with heavy molded base, and a lip for pouring.

*Height, mm	125	150	150	200	250	300	300
Diameter, mm	25	25	40	40	40	40	50
Number to a case	72	72	72	72	72	72	36
Each	**$ .25**	**.30**	**.35**	**.40**	**.45**	**.50**	**.60**

Dozen lots, 15% discount. **Lots of 100,** 25% discount.

Height, mm	375	450	550
Diameter, mm	50	65	75
Number to a case	36	36	24
Each	**$ .75**	**1.00**	**1.50**

Dozen lots, 10% discount. **Case lots,** 20% discount.

8-535. CYLINDERS, Flared Flange Neck, with fire finished top and heavy molded base.

Height, mm	150	200	250	300	375
Diameter, body, mm	25	40	40	50	50
Each	**$ .35**	**.45**	**.50**	**.65**	**.80**

Dozen lots, 15% discount.

8-540. CYLINDERS, Wide Form, Heavy Ring Neck. The **tops are ground** to take a glass plate; with heavy molded base.

Height, mm	300	300	450
Diameter, body, mm	75	100	75
Each	**$1.60**	**2.85**	**2.00**

Dozen lots, 10% discount.

8-545. CYLINDERS (Hydrometer Jars), with enlarged tops to prevent overflowing; with heavy molded base.

*Height, mm	300	350	400
Diameter, body, mm	45	45	50
Diameter, top, mm	60	65	70
Each	**$ .70**	**.90**	**1.00**

Dozen lots, 10% discount.

**Sizes adopted by the American Chemical Society, Standardization Committee.*

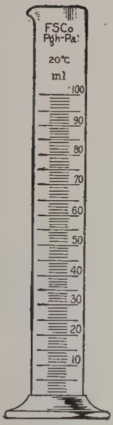
REGARDING GRADUATED CYLINDERS

All of our Graduated Cylinders are calibrated on the basis of the true Metric Liter, which is the volume occupied by one kilogram of pure water at 4° C.; this volume is then adjusted for 20° C. One one-thousandth part of this volume is a milliliter and is abbreviated—ml.

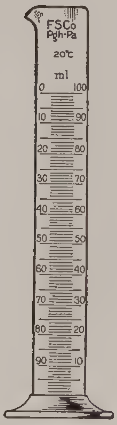
The United States Bureau of Standards recommends that small size cylinders be used for measuring small quantities; if the quantity falls within the lower one-tenth portion of a cylinder, a smaller cylinder should be used.

GRADUATED CYLINDERS

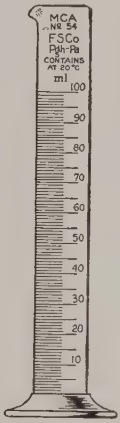
(See note at bottom of page 284)



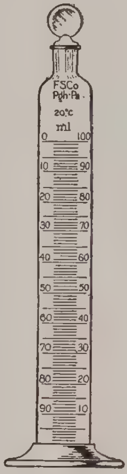
8-550



8-555



8-560



8-565

8-550. CYLINDERS, Graduated, with zero at the bottom; the style most used. Made with heavy base and lip for pouring.

*Capacity, ml	5	10	25	50	100	250	500	1000	2000
Subdivided, ml	1/10	1/5	1/2	1	1	2	5	10	20
Number to a case	72	72	72	72	72	36	36	24	24
Each	**$ .55**	**.55**	**.50**	**.60**	**.70**	**1.00**	**1.45**	**1.95**	**3.30**

Dozen lots, 10% discount. **Case lots,** 20% discount.

8-555. CYLINDERS, Graduated, Double Reading. Similar to No. 8-550, but numbered to read up on one side and down on the other side.

*Capacity, ml	5	10	25	50	100	250	500	1000	2000
Subdivided, ml	1/10	1/5	1/2	1	1	2	5	10	20
Number to a case	72	72	72	72	72	36	36	24	24
Each	**$ .60**	**.60**	**.55**	**.70**	**.80**	**1.10**	**1.55**	**2.25**	**3.55**

Dozen lots, 10% discount. **Case lots,** 20% discount.

8-560. CYLINDERS, Graduated, M. C. A. Specifications. Made according to the specifications of the Manufacturing Chemists' Association of the United States. Every fifth graduation mark extends one-third of the way around the cylinder, and all other graduations extend one-sixth of the way around; the methods employed in calibrating are the accepted methods of the Bureau of Standards. Each cylinder bears the "M. C. A." initials, an identification number, the word "contains" and "20° C.," also our "F. S. Co." initials. The limits of error of total or partial capacity of the respective sizes, are as follows:

Capacity	Limits of error	Capacity	Limits of error
10 ml	0.05 ml.	250 ml	1.25 ml.
25 ml	0.12 ml.	500 ml	2.50 ml.
50 ml	0.25 ml.	1000 ml	5.00 ml.
100 ml	0.20 ml.	2000 ml	10.00 ml.

The 100 ml. cylinder is used for accurate "distillation range" tests and is made to U. S. B. S. tolerances.

Capacity, ml	10	25	50	100	250	500	1000	2000
Subdivided, ml	1/2	1/2	1	1	5	5	10	10
Each	**$ .75**	**.75**	**.85**	**2.50**	**1.10**	**1.85**	**2.35**	**4.00**

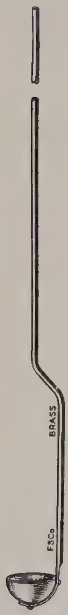
8-565. CYLINDERS, Graduated, with glass stoppers. Numbered to read up on one side and down on the other side. With heavy base and each glass stopper ground to fit its cylinder.

*Capacity, ml	10	25	50	100	250	500	1000	2000
Subdivided, ml	1/5	1/2	1	1	2	5	10	20
Number to a case	72	72	72	72	36	36	24	24
Each	**$1.00**	**.85**	**1.00**	**1.20**	**1.50**	**2.35**	**3.30**	**5.60**

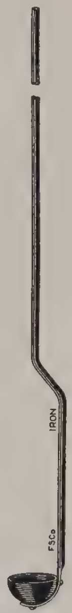
Dozen lots, 10% discount. **Case lots,** 20% discount.

**Sizes adopted by the American Chemical Society, Standardization Committee.*

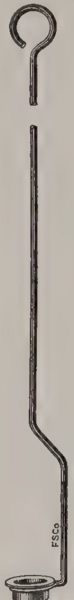
Deflagration Spoons



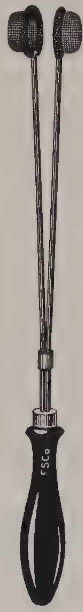
8-570



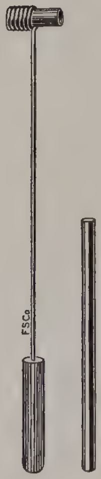
8-575



8-580



8-585



8-590

CHEMICALS
AND
REAGENTS
are listed separately in the rear of this catalogue

2-955

CYLINDERS OF GASES

AMMONIA ***CARBON DIOXIDE*** ***OXYGEN*** ***SULPHUR DIOXIDE***

See Gases, No. 10-565 to 10-585 inclusive

DECOMPOSITION OF WATER AND ELECTROLYTES, see Electro-Chemical Apparatus, page 321.

DEFLAGRATION SPOONS

8-570. DEFLAGRATION SPOON, Brass, not readily oxidized. Diameter of bowl, ¾ inch; length, 15 inches.
Each, $ .20
Dozen lots, 10% discount

8-575. DEFLAGRATION SPOON, Iron, withstands higher temperatures than brass and is not readily alloyed. Diameter of bowl, ¾ inch; length, 15 inches.
Each, $ .16
Dozen lots, 10% discount

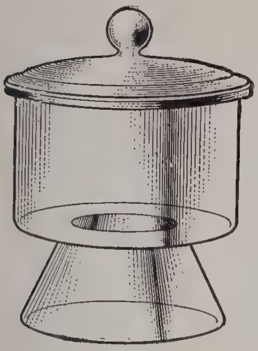
8-580. DEFLAGRATION AND COMBUSTION SPOON, Parker. The removable iron cup, ¾ inch diameter, can be placed in the holder at one end and used for deflagrations, or it can be placed in the holder at the other end and used for combustions. Length of handle, 15 inches.
Each, $ .25
Dozen lots, 10% discount

8-585. DEFLAGRATION HOLDER, for Sodium. Consists of two hemispherical brass gauze bowls, ¾ inch diameter, which are opened and closed by sliding the clamp, and completely enclose the sodium. The holder has a wooden handle; length over all, 12 inches.
Each, $ .60

8-590. DEFLAGRATION HOLDER AND PRESS, for Sodium. Made of brass with a ¼ inch cup; supplied with a brass ramrod for compressing the sodium. The holder has a wooden handle; length over all, 9 inches.
Each, $ .45

2-955. DEMIJOHNS, Wicker Covered. Made of heavy glass, with woven wicker jackets and handles for protection against breakage and easy handling of large quantities of dangerous or other liquids. The wicker, covering the bottom of the Demijohn, is extra heavy.

Capacity, gallons	2	5
Each	**$2.25**	**3.75**



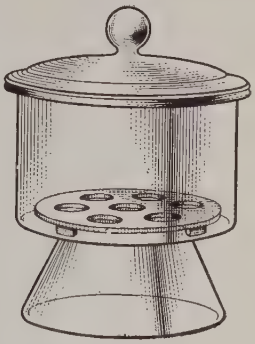
8-595

REGARDING DESICCATORS

Caution should be used in evacuating glass desiccators; the vacuum should be applied gradually and should not be in excess of 12 inches of mercury for the usual glass desiccators No. 8-605, No. 8-610 and No. 8-620, and not in excess of 20 inches of mercury for the Pyrex Desiccators No. 8-625 and No. 8-630.

Some desiccators may withstand higher vacuums, but it is considered unsafe to go beyond the limits specified.

Desiccators will longer maintain a vacuum when a thin film of vaseline is applied to the ground surfaces.



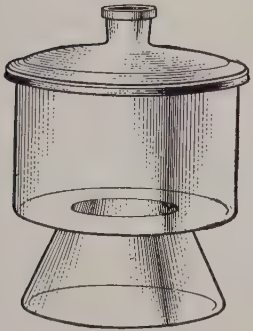
8-600

8-595. DESICCATORS, Scheibler, Plain. These desiccators are well made of heavy glass, thoroughly annealed, with wide rims ground true and covers ground to fit the rims. The grinding is finished with a fine abrasive.

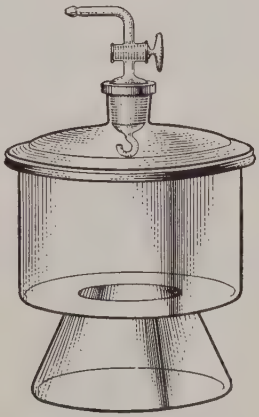
* Diameter, inside, mm.	100	125	150	200	250
Each	**$1.50**	**1.95**	**2.60**	**6.60**	**9.50**

8-600. DESICCATORS, Scheibler, Plain, with Porcelain Plates. Desiccators No. 8-595, supplied with porcelain plates with 30 mm. holes for holding crucibles.

* Diameter, inside, mm.	100	125	150	200	250
Number of holes in plates	3	4	5	7	8
Each	**$2.20**	**2.70**	**3.70**	**8.40**	**11.75**



8-605



8-610

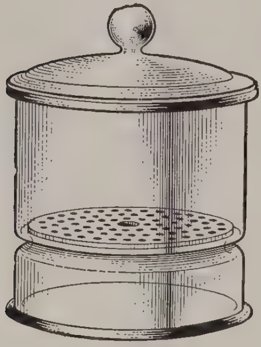
8-605. DESICCATORS, Scheibler, with Tubulated Covers. Made of heavy, well annealed glass, with broad rims ground true and covers ground to fit the rims. The grinding is finished with a fine abrasive. Covers have a tubulature in top to take a rubber stopper. Desiccators with tubulations in the covers are recommended by the Standardization Committee of American Chemical Society. This style supersedes the old style with the tubulature on the side. For use under partially reduced pressure, but not to be used with a high vacuum. (*See Introduction to Desiccators.*)

* Diameter, inside, mm.	150	200	250
Each	**$4.00**	**8.00**	**10.50**

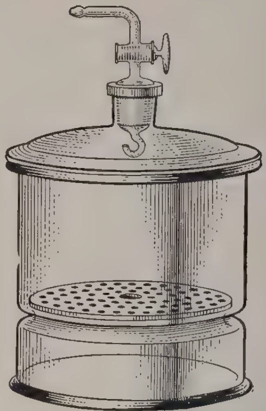
8-610. DESICCATORS, Scheibler, with Ground Stopcock. Made of heavy, well annealed glass, with broad rims ground true and covers ground to fit the rims. The grinding is finished with a fine abrasive. Covers have a tubulature into which has been ground to fit, a glass stopcock with a hook. For use under partially reduced pressure, but not to be used with a high vacuum. (*See Introduction to Desiccators.*)

* Diameter, inside, mm.	150	200
Each	**$7.00**	**10.00**

**Sizes recommended by the American Chemical Society, Standardization Committee.*



8-615



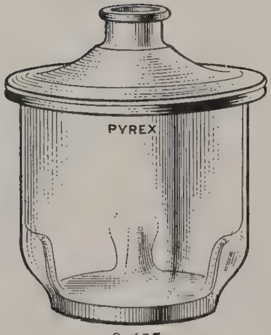
8-620

8-615. DESICCATOR, F. & S. Made of heavy, well annealed glass, with broad rims ground true and covers ground to fit. The grinding is finished with a fine abrasive. In this desiccator, the lower chamber for the absorbents is not contracted, and the opening to the upper chamber is larger. This makes it more convenient for using solid dryers. Supplied **with a glazed porcelain plate,** perforated with 5 mm. holes.

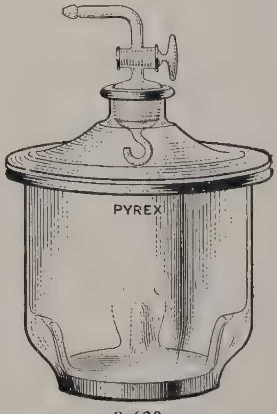
* Diameter, inside, mm.	200	250
Each	**$9.75**	**13.75**

8-620. DESICCATORS, F. & S., with Ground Stopcock. Similar to No. 8-615, excepting that the cover has a tubulature into which has been ground to fit, a glass stopcock with hook. A glazed porcelain plate, perforated with 5 mm. holes is supplied. For use under partially reduced pressure, but not to be used with a high vacuum. (*See Introduction to Desiccators.*)

* Diameter, inside, mm.	200	250
Each	**$11.75**	**16.50**



8-625



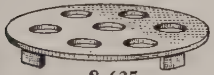
8-630

8-625. DESICCATOR, Pyrex, Vacuum. Made of extra heavy Pyrex glass, which on account of its thermal resistance and mechanical strength, makes the most satisfactory glass desiccator for vacuum. This is the only glass desiccator that we recommend for use with a vacuum up to 20 inches of mercury. (*See Introduction to Desiccators.*)

The flange of the desiccator is broad and heavy, is ground flat, and fits the broad, ground rim of the cover which is tubulated to take a No. 7 Rubber Stopper. Three lugs of glass are in the desiccator, to support a desiccator-plate 190 mm. diameter, at a height of about 50 mm. from the bottom of the desiccator. The porcelain plate is not supplied under this number. It can be ordered separately under No. 8-640. Inside diameter of desiccator, 200 mm.; height, without cover, 200 mm.* **Each, $12.50**

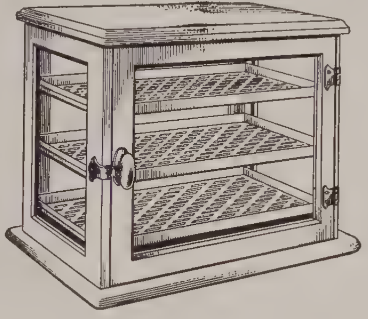
8-630. DESICCATOR, Pyrex, Vacuum, with Ground Stopcock. Similar to No. 8-625, excepting that it has a glass stopcock with hook ground to fit the tubulature in the cover. Inside diameter, 200 mm.; height, without cover, 200 mm.* **Each, $18.00**

**Sizes recommended by the American Chemical Society, Standardization Committee.*



8-635

8-640



8-645

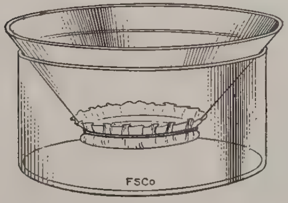
8-635. DESICCATOR PLATES, Porcelain, with three feet and large holes for crucibles. The holes are approximately 30 mm. diameter. The upper side of the plates is glazed.

* Diameter of plate, mm	90	115	140	190	230
Number of holes	3	4	5	7	8
For desiccators, diameter, mm	100	125	150	200	250
Each	**$ .70**	**.75**	**1.10**	**1.80**	**2.25**

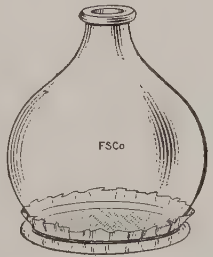
8-640. DESICCATOR PLATES, Porcelain, without feet, small holes. Glazed on one side; perforated with 5 mm. holes.

* Diameter of plate, mm	190	230
For Desiccators, mm	200	250
Each	**$2.00**	**2.60**

8-645. DESICCATOR CABINET, White Enameled, constructed of wood, with four glass sides. A rubber strip fitted around the inside of the door makes the cabinet air-tight, when closed. There are three perforated metal shelves, which measure 11¾ inches long and 6¾ inches wide. These provide a large storing capacity. The shelves are removable for cleaning and adjustable to several heights. The inside and outside of the cabinet, including the shelves, are enameled white and the hardware is nickel-plated. Can be used for drying, also for storing samples out of contact with moisture. Outside dimensions: 14 inches wide, 12 inches high and 9 inches deep. **Each, $16.50**



8-650



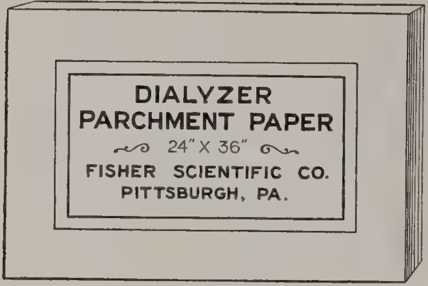
8-655

8-650. DIALYZER, for the dialysis of small amounts of material. This dialyzer consists of a glass reservoir with a ground rim and a cone-shaped dialysis bowl. The opening in the bottom of the bowl is covered with parchment. The outer edge of the cover is ground so that a glass plate can be used for covering, and all dust and foreign matter excluded during the dialysis.

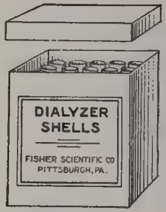
Diameter of reservoir, mm	150	200
Capacity of reservoir, liters	1	2
Diameter of bowl opening, mm	40	85
Each	**$3.50**	**4.50**

8-655. DIALYZING CELL, for the preparation of extracts of glands, herbs, etc., by dialysis through parchment. This cell may also be used to demonstrate the transference of matter through a membrane by means of osmotic pressure, as illustrating the separation of urine from the blood stream, entrance of food into roots, etc. The cell consists of a special bell glass, 5 inches in diameter at the mouth and 8 inches high. Over the mouth of this is stretched a parchment membrane. This gives a very large dialyzing area, so that results are obtained in a minimum of time. This Dialyzer Cell can be used with Battery Jar No. 2-525, size 7 x 9 inches, or it can be suspended in an extractor tank and used for the commercial preparation of extracts, etc. **Each, $3.50**

**Sizes recommended by the American Chemical Society, Standardization Committee.*



8-660

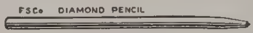


8-665

8-660. DIALYZER PARCHMENT PAPER. Sheets 24 inches by 36 inches. .... **Per sheet, $ .20**
Per quire, $2.00

8-665. DIALYZER SHELLS (Diffusion Shells). Especially prepared for dialysis and osmosis determinations; are uniform in texture, and are better adapted for these purposes than parchment. A very convenient shape as small volumes can be exposed to a large dialyzing surface. The shells are 100 mm. high and 16 mm. diameter. Sold only in boxes of 25 shells. **Per box, $5.40**

8-670



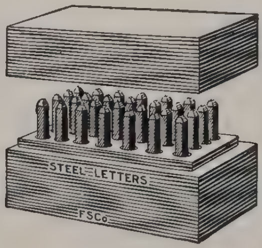
8-675

8-670. DIALYZER TUBING, of heavy parchment paper; 45 mm. diameter..................... **Per yard, $ .15**

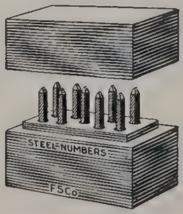
8-675. DIAMOND, for writing on glass, mounted in a metal handle.............................. **Each, $3.00**

DIAMOND, for cutting glass. See Glass Cutters.

8-677



8-680



8-685

8-677. DIAMOND INK, for writing on glass, in one (1) ounce ceresine containers packed in saw-dust in paste-board cartons. **Per ounce, $ .55**

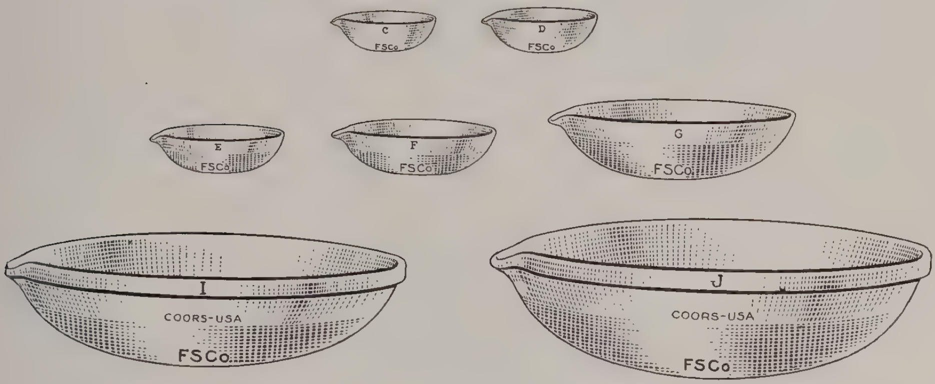
8-680. DIES, Letters, A to Z and a period. Used for marking metal samples, and for putting identification marks on articles of metal or wood. The set is supplied in a wooden block, with separate compartment for each letter; provided with a cover.

Height of letters, inches	1/8	1/4
Per set	**$3.75**	**6.00**

8-685. DIES, Numbers. Used for the same purposes as No. 8-675. The number six (6) is inverted for nine (9). The set is supplied in a wooden block, with a separate compartment for each number; provided with a cover.

Height of figures, inches	1/8	1/4
Per set	**$1.25**	**2.00**

DISHES



8-690

REGARDING PORCELAIN EVAPORATING DISHES

In standardizing porcelain evaporating dishes, The American Chemical Society, Committee on Standard Apparatus found that it was the unanimous opinion that there was no necessity for making the usual style dish in eighteen (18) different sizes. They also found that each laboratory was omitting many sized dishes in selecting a range of sizes, and that while one laboratory was using sizes Nos. 1, 3, 5 and 7, another laboratory, often in the same organization, was using sizes Nos. 2, 4, 6 and 8. This made the stock-keeping more difficult and required additional work and investment.

The American Chemical Society Committee found that by creating two new sizes, the entire range of size could be completely covered by eleven (11) different dishes and that, from these sizes, dishes could be selected for every requirement. They then adopted these sizes, and many U. S. Government and other laboratories have standardized the practice of using these dishes.

The eleven (11) standardized sizes are those listed under No. 8-690; we carry all of them in stock and are discontinuing the other odd sizes.

8-690. DISHES, Evaporating, Coors Porcelain. The smaller sizes are glazed inside and outside. Sizes E and larger, are glazed on the inside and, for a short space from the rim, on the outside. Sizes I, J and K have reinforced rims. The sizes listed are the A. C. S. standardized sizes, referred to in the introduction.

* New size designation	A	B	C	D	E	F
Diameter, mm.	60	75	90	100	115	145
Capacity, ml	35	70	140	175	250	385
Old size No	000	00A	2	3	4A	6
Each	**$ .10**	**.12**	**.23**	**.27**	**.35**	**.50**

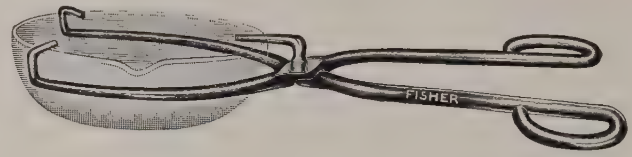
* New size designation	G	H	I	J	K
Diameter, mm.	215	265	360	400	460
Capacity, liters	1.3	2.2	5.7	10	16.5
Old size No	8	9	11	12	13
Each	**$ .85**	**1.25**	**2.90**	**6.90**	**12.00**

Our discounts apply to the Total List Prices of all COORS PORCELAIN on your order, including Casseroles, Crucibles, Dishes, etc.

Lots of $ 500.00 List Prices	**10% Discount**
Lots of $ 750.00 List Prices	**15% Discount**
Lots of $1000.00 List Prices	**20% Discount**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

FISHER SAFETY DISH TONG



5-815

5-815. DISH Tong, Fisher Safety. (*Patented December, 1924*) **Made of Ascoloy.** This is a new tong designed especially to fill the need for a device for the convenient and safe handling of hot evaporating dishes and their contents.

Design. With this tong, dishes are firmly gripped by the tong and held in this grip by the hand, and not merely supported by a piece of spring wire.

The tips of the jaws project up and over the top of the dish, and a centre prong from the joint projects out over the top of the dish. The dish is held below and on the sides by the jaws, and at three points on the top by the prongs so that it cannot possibly get out of tong until the handles are released.

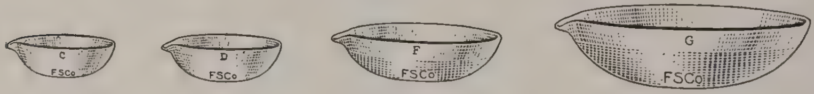
Features. The grip permits hot dishes to be handled without liability of spilling the contents, or dropping the dish.

Contents of dishes can be poured without liability of spilling.

Dishes can be held firmly in an inverted position, and precipitates brushed out.

It is made of **Ascoloy,** a new stainless iron, which is tough and resists bending; will not rust, and is highly resistant to acids, especially nitric acid.

The Tong is 9½ inches over all. This one size tong adjusts itself to different size dishes, and will firmly grip evaporating dishes, sizes B to E inclusive, or similar vessels with diameters from 75 mm. to 120 mm. inclusive. The Fisher Safety Dish Tong is the only device that we know of with which hot dishes and their contents can be handled conveniently and without liability of accidents. **Each, $1.25**

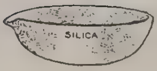


8-695

8-695. DISHES, Evaporating, Imported Porcelain. A less expensive grade of porcelain which has been supplied for many years and is often used for students' work. The smaller sizes are glazed inside and outside. Sizes "F" and "G" are glazed inside and, for a short distance from the rim, on the outside.

Size	A	B	C	D	E	F	G
Diameter, mm	60	80	95	110	120	150	200
Capacity, ml	35	80	140	225	300	350	1000
Each	**$ .13**	**.20**	**.35**	**.45**	**.60**	**.80**	**1.30**

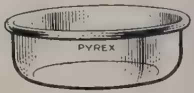
Lots of 100, 15% discount.



8-700

8-705

8-710



8-715

8-700. DISHES, Evaporating, Glazed Silica, with lip for pouring; made of opaque, glazed silica, which will withstand very high temperatures and severe heat changes.

* Capacity, ml	45	80	100	200
Diameter, mm	70	85	95	105
Each	**$1.50**	**1.65**	**2.15**	**2.50**

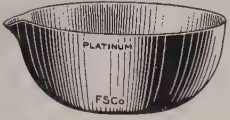
8-705. DISH, Evaporating, Tannin, Silica, Capsule Shape. This is a special dish made of glazed opaque silica, with flat bottom; used in the analysis of tan-liquors. Capacity, 120 ml.; diameter, 82 mm.; depth, 25 mm.; without lip. **Each, $2.00**

8-710. DISHES, Evaporating, Pyrex Glass, with lip for pouring. These dishes are heavy and are made with a flat bottom so that they will stand without tipping. While Pyrex Glass has a higher softening point and a lower coefficient of expansion than that of other glass, it is not suited for chemical baking or roasting.

Diameter of top, mm	80	90	105	125
Depth, mm	45	50	55	65
Each	**$ .35**	**.40**	**.45**	**.75**

8-715. DISH, Heavy Pyrex Glass, with heavy rim around the top. Used in some laboratories for evaporations, for low-temperature baking and for heating dry materials. This dish will not replace porcelain for high-temperature work. It is heavy and will withstand ordinary handling. Diameter, 155 mm.; depth, 45 mm.; capacity, 575 ml. **Each, $ .60**

**Sizes recommended by the American Chemical Society, Standardization Committee.*



8-717

8-718

8-719

8-717. DISHES, Evaporating, Platinum. The usual form, with round bottoms and pour-outs; hammered to shape. Because of the daily fluctuation in price, platinum-ware is sold by the gram in accordance with the current quotation for this metal.

Capacity, ml	25	50	75	100	150
Diameter, mm	44	56	65	72	84
Weight, approx., grams	8	17	25	33	50

Price upon application.

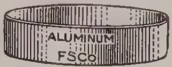
8-718. DISH, Evaporating, Platinum, Shallow Form. Used in water analysis, in iron and steel analysis and for other purposes where a shallow form dish is desired. This dish is hammered to shape and made with a pour-out. The bottom is flat with a rounded edge. Capacity, 45 ml.; diameter, 60 mm.; approximate weight, 16 grams. Because of the daily fluctuation in price, platinum-ware is sold by the gram in accordance with the current quotation for this metal. **Price upon application.**

8-719. DISH, Evaporating, Platinum, for Water Analysis. Made of light weight material, without pour-out, shallow in form, especially for water analysis; hammered to shape. Capacity, 100 ml.; diameter, 80 mm.; approximate weight, 20 grams. Because of the daily fluctuation in price, platinum-ware is sold by the gram in accordance with the current quotation for this metal. **Price upon application.**

Note: Platinum dishes of other shapes and capacities, with or without pour-outs, with or without wire rims, can be supplied upon short notice.

8-720

8-725



8-730

8-735

8-720. DISHES, Evaporating, Nickel; made of pure sheet nickel, spun to shape.

Capacity, ml	100	200
Diameter, mm	60	80
Each	**$1.70**	**2.40**

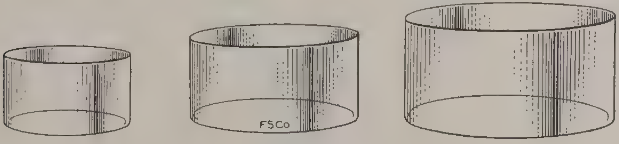
8-725. DISH, Evaporating, Nickel, Barrett Type, with handle; used to evaporate tars and pitches in Barrett Test D-10. See *Ind. and Eng. Chem., X-817 (October, 1918)*. Made of pure nickel sheet, diameter at top, 55 mm.; diameter at bottom, 50 mm.; depth, 15 mm. **Each, $2.25**

8-730. DISHES, Evaporating, Milk, Aluminum; made of light aluminum, with straight sides and flat bottoms; used for determining total solids in milk by evaporating to dryness.

* Diameter, mm	50	65	75	100
Depth, mm	12	15	20	25
Each	**$ .22**	**.25**	**.35**	**.55**

8-735. DISHES, Evaporating, Milk, Tin Foil. This is an inexpensive kind of dish used for milk analysis.

Diameter, mm	65	70	90
Depth, mm	30	20	13
Per 10	**$ .40**	**.40**	**.45**
Per 100	**$3.40**	**3.40**	**3.75**



8-740

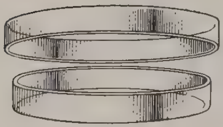
8-740. DISHES, Evaporating, Crystallizing; made of clear glass with flat bottoms and straight sides.

* Diameter, mm	50	60	80	100	125	150	190
Depth, mm	35	35	40	50	65	75	95
Each	**$ .25**	**.30**	**.35**	**.40**	**.60**	**.95**	**1.25**

Dozen lots, 10% discount. **Gross lots,** 20% discount.

**Sizes recommended by the American Chemical Society, Standardization Committee.*

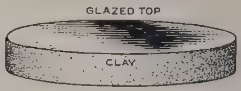
PETRI DISHES



8-755
8-762

8-760

8-765



8-770

8-755. DISHES, Culture, Petri, with covers; made of clear glass, well annealed, with flat bottoms and straight sides.

The Standardization Committee of the American Bacteriological Society has recommended the 100 mm. size as standard. They recommend this 100 mm. dish in two depths, 10 mm. and 15 mm.; for those desiring a smaller or a larger dish, they have adopted the other two sizes listed. The 100 mm. dish with a 15 mm. depth is more convenient for mixing, and is the size most used.

* Diameter of upper dish, outside, mm.	75	100	100	150
Diameter of lower dish, outside, mm.	70	95	95	143
Depth of lower dish, inside, mm.	10	10	15	20
Per dozen	**$3.00**	**3.00**	**3.00**	**7.25**

Gross lots, 10% discount.

8-760. DISH, Culture, Petri, without Cover (Lower Dish). Petri Dishes are often used with Clay Covers No. 8-765 and No. 8-770. The diameter of this dish is 95 mm., and the depth is 15 mm.

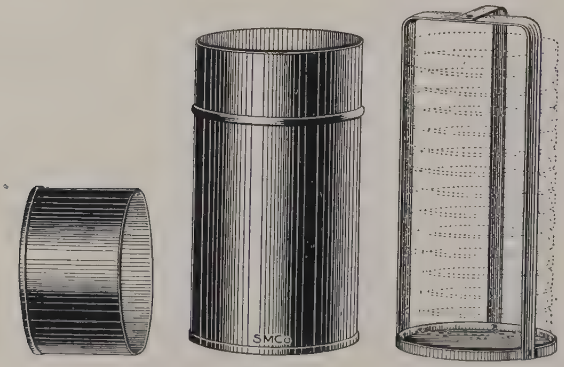
Per dozen, $1.50
Gross lots, 10% discount

8-762. DISH, Culture, Petri. Made of **Resistance Glass** to withstand steam sterilization. Diameter of cover, 100 mm.; depth of lower dish, 15 mm.

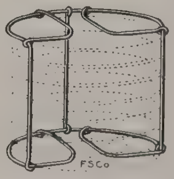
Per dozen, $4.80

8-765. DISH COVER, Unglazed Clay, for Petri Dishes No. 8-760. This is a porous cover, made of a fine composition clay, which absorbs the moisture of condensation. This cover will fit the Lower Dishes of the standard 100 mm. size, either the 10 mm. or the 15 mm. depth. **Per dozen, $1.80**

8-770. DISH COVER, Clay, Glazed Top, for Petri Dishes No. 8-760. This cover is similar to Clay Cover No. 8-765, except that the outside top is glazed. **Per dozen, $2.40**



8-775

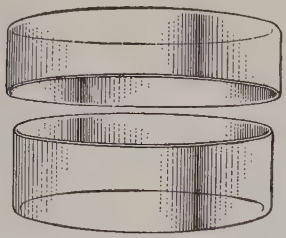


8-780

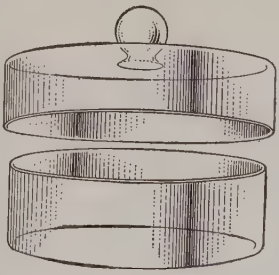
8-775. DISH BOX, Polished Copper, for Petri Dishes; used as a container for Petri Dishes in the sterilizer, and for protecting sterile dishes from contamination. The box is 115 mm. diameter and 225 mm. high. It is supplied with a tightly fitting cover and a removable tray, which fits inside the box and will hold either fifteen (15) Petri Dishes 100 x 15 mm. or twelve (12) Petri Dishes 100 x 10 mm. **Each, $4.00**

8-780. DISH HOLDER, Wire, for Petri Dishes; made of nickel-plated, brass, spring wire. This holder will clamp together seven (7) Petri Dishes 100 x 10 mm. or five (5) Petri Dishes 100 x 15 mm. and will be found convenient in handling Petri Dishes in and out of the incubator. **Each, $ .60**
Dozen lots, 10% discount

**Sizes Recommended by the American Chemical Society Standardization Committee.*



8-782

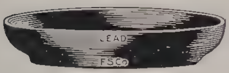


8-783

8-782. DISH, Culture, Moist Chamber, without knob on cover. This is a large double dish, one part of which is used as a loosely fitting cover when the two parts are used together. Diameter of cover, outside, 240 mm.; depth of dish, inside, 80 mm. **Each, $4.00**

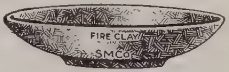
8-783. DISHES, Culture, Moist Chambers, with knob on cover.

Diameter of cover, outside, mm.	200	240
Depth of dish, inside, mm.	70	80
Each	**$3.75**	**4.50**



8-785

8-790



8-795

8-785. DISHES, Lead, for use with hydrofluoric acid and other glass etching materials. The dishes are shallow in form and are made of material heavy enough to withstand the usual handling.

Diameter, mm.	50	75	100
Each	**$ .15**	**.20**	**.30**

Per dozen, 10% discount.

8-790. DISHES, Moisture, Aluminum, with covers; used for moisture determinations in soil analysis and for any other purpose where a non-rusting covered dish is desired. The covers fit tightly, for use in transporting samples, and when removed can be fitted over the bottoms to prevent them from being lost.

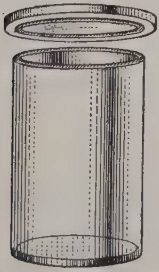
Diameter, mm.	50	63	90
Depth, mm.	22	44	50
Each	**$ .40**	**.70**	**.90**

Per dozen, 10% discount.

8-795. DISHES, Roasting, Denver Fire Clay; for roasting ores in metallurgical tests, assaying, incinerating coal, etc.

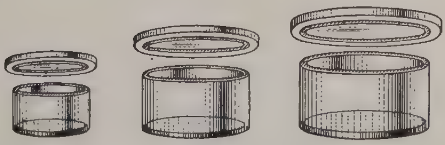
Diameter, mm.	75	100	125
Each	**$ .25**	**.30**	**.35**

Dozen lots, 10% discount.



8-800

PREPARATION DISHES



8-805

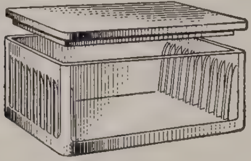
8-800. DISH, Preparation, "Stender," High Form; used for preparing microscopic specimens, and for storing clean slides; made of clear glass with cover ground to fit. Height, 90 mm.; diameter, 60 mm. **Each, $ .45**
Per dozen, 10% discount

8-805. DISHES, Preparation, "Stender," Low Form; used for preparing and storing microscopic specimens, and for paraffin embedding. Made of clear glass with cover ground to fit.

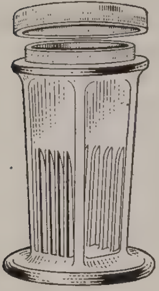
Diameter, mm.	36	50	60
Height, mm.	19	25	28
Each	**$ .25**	**.35**	**.45**

Dozen lots, 10% discount.

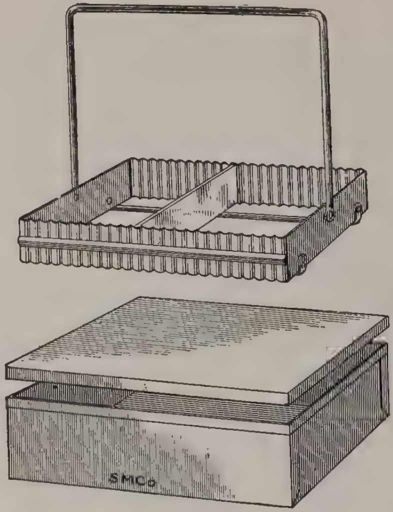
Dishes



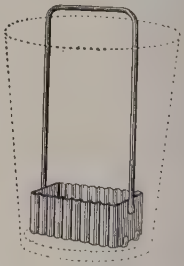
8-810



8-815



8-820



8-825
See also No. 8-830

8-810. DISH, Staining, Horizontal; for holding microscope slides while they are being stained; made of heavy molded glass with ten (10) grooves, which hold the standard 75 x 25 mm. microscope slides. If the slides are inserted in pairs, back to back, the dish will hold twenty (20) slides. Dimensions inside: 80 x 55 mm. x 32 mm. deep. **Each, $ .45**
Dozen lots, 10% discount

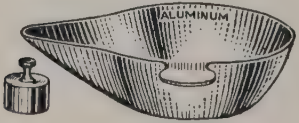
8-815. DISH, Staining, Vertical, Coplin; for holding microscope slides vertically while they are being stained; made of heavy molded glass with five (5) grooves, which hold the standard 75 x 25 mm. microscope slides. If the slides are inserted in pairs, back to back, the dish will hold ten (10) slides. The body of the jar is rectangular and the top is circular, and has a round glass cover ground to fit. This type of jar requires less staining solution. Height over all, 110 mm.; outside diameter of cover, 60 mm. **Each, $ .40**
Dozen lots, 10% discount

8-820. "DISH" STAINING OUTFIT, Monel Metal; for staining microscope slides. Monel metal will not rust and is not attacked by biological stains. The outfit consists of a monel metal rack, with compartments for holding two (2) slides each, and a monel metal tray which is used as the container for the staining solution. A tin lid is supplied for the tray to cover it when not in use. The monel rack holds the standard microscope slides 75 x 25 mm.

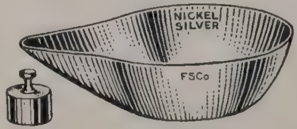
Size	A	B	C
Number of compartments	12	25	50
Number of slides held	24	50	100
Each	**$7.50**	**9.50**	**14.00**

8-825. "DISH" STAINING RACK, Monel Metal; for holding microscope slides vertically while being stained. Monel metal will not rust and is not attacked by biological stains. The rack contains eight (8) compartments and will accommodate sixteen (16) microscope slides 75 x 25 mm., placed back to back. The outside measurements at the bottom are about 27 x 45 mm., which enables the rack to be used in connection with the usual 12-oz. glass tumbler. The height of the rack over all is 125 mm. For glass tumblers, see No. 8-830. Supplied without tumbler. **Each, $4.00**

8-830. GLASS TUMBLER, for use with No. 8-825 Staining Racks; made of heavy glass, not intended to be heated; capacity to brim, 12 ounces; inside diameter of bottom, 46 mm.; height, 115 mm. **Each, $ .15**
Dozen lots, 10% discount



8-835



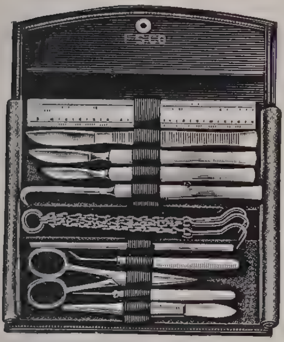
8-840

8-835. DISHES, Weighing, Aluminum, with pour-out and handle. Each dish is supplied with a counterpoised, brass weight.

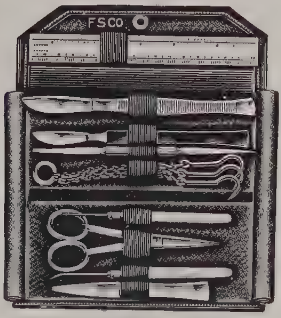
Capacity, ml	15	30
Each, with weight	**$2.00**	**2.40**

8-840. DISH, Weighing, Nickel-silver (Sugar Capsule), without handle. Each dish is supplied with a counterpoised, brass weight. Capacity, about 30 ml. **Each, $4.25**

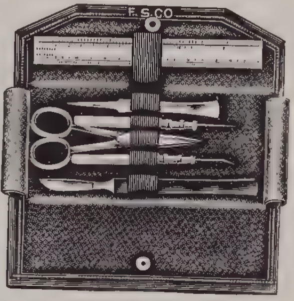
DISSECTING INSTRUMENTS



8-845
See also No. 8-860



8-850
See also No. 8-865



8-855
See also No. 8-870

BIOLOGICAL—BOTANICAL

The Dissecting Instruments, shown here, are those most used and represent our carefully chosen stock. From these instruments, a selection can be made to meet the requirement for dissecting in Zoölogy, Botany and kindred sciences.

The Dissecting Sets include the instruments most used in classroom work. Other sets can be assembled from a selection of the separate instruments and cases illustrated and described.

8-845. DISSECTING SET, Double Compartment, Real Leather Case, velvet lined. All instruments are high grade, nickel-plated and highly polished. This is a fine set, adapted for both biological and botanical work, and contains the following eleven (11) pieces:

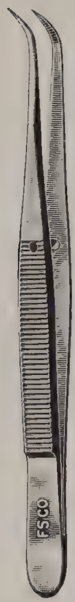
Forceps, nickel-plated, medium points, No. 8-885
Scissors, nickel-plated, 40 mm. blade, No. 8-945
Scalpel, all-metal, 25 mm. blade, No. 8-920
Scalpel, all-metal, 38 mm. blade, No. 8-920
Cartilage Knife, all-metal, 45 mm. blade, No. 8-925
Tanaculum, all-metal, 160 mm. long, No. 9-005
Needle Holder, bone-handled, No. 8-955, with straight needle
Needle Holder, bone-handled, No. 8-955, with bent needle
Blowpipe, nickel-plated, 140 mm. long, No. 9-015
Hooks and Chains, nickel-plated, 150 mm. long, No. 9-010
Celluloid Rule, 150 mm. long, Metric and English Scales, No. 9-020 **Per set, $7.00**

8-850. DISSECTING SET, Double Compartment, Leatherette Case, felt lined; suitable for biological and botanical dissections. This is a set of practical instruments and contains the following nine (9) pieces:

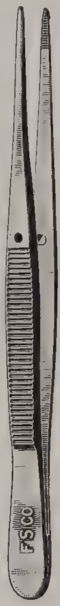
Forceps, nickel-plated, heavy points, No. 8-895
Scissors, nickel-plated, 40 mm. blade, No. 8-945
Scalpel, ebony-handled, 38 mm. blade, No. 8-910
Cartilage Knife, all-metal, 45 mm. blade, No. 8-925
Combination Seeker and Tanaculum, all-metal, No. 9-000
Needle Holder, bone-handled, No. 8-955, with straight needle
Needle Holder, bone-handled, No. 8-955, with bent needle
Hooks and Chains, nickel-plated, 150 mm. long, No. 9-010
Celluloid Rule, 150 mm. long, Metric and English Scales, No. 9-020 **Per set, $3.75**

8-855. DISSECTING SET, Single Compartment, Leatherette Case, felt lined. This is a less expensive set which includes only the most used instruments. The case when folded can easily be carried in the pocket. The set contains the following six (6) pieces:

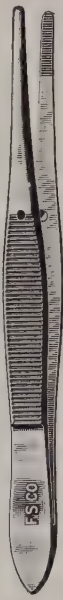
Forceps, nickel-plated, medium points, No. 8-900
Scissors, nickel-plated, 40 mm. blade, No. 8-945
Scalpel, ebony-handled, 38 mm. blade, No. 8-910
Needle Holder, bone-handled, No. 8-955, with straight needle
Needle Holder, bone-handled, No. 8-955, with bent needle **Per set, $2.00**
Celluloid Rule, 150 mm. long, Metric and English Scales, No. 9-020 **Dozen sets,** 10% discount



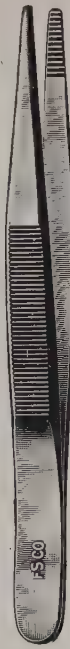
8-875



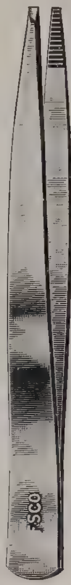
8-880



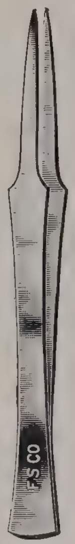
8-885



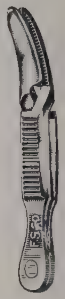
8-890



8-895



8-900



8-905

8-860. DISSECTING INSTRUMENT CASE, Double Compartment, Real Leather, velvet lined. This is the empty case into which Dissecting Set No. 8-845 is fitted. Can be used to hold a selection of the instruments listed. **Each, $2.00** **Dozen lots,** 10% discount

8-865. DISSECTING INSTRUMENT CASE, Double Compartment, Leatherette, felt lined. This is the empty case into which Dissecting Set No. 8-850 is fitted. Can be used to hold a selection of the instruments listed. **Each, $ .70** **Dozen lots,** 10% discount

8-870. DISSECTING INSTRUMENT CASE, Single Compartment, Leatherette, felt lined. This is the case into which Dissecting Set No. 8-855 is fitted. Can be used to hold a selection of the instruments listed. **Each, $ .55** **Dozen lots,** 10% discount

8-875. DISSECTING FORCEPS, Sharp Points, Curved; made of nickel-plated steel, highly polished, with inside of points file-cut. The handles are corrugated and are made with a guide-pin. Length over all, 115 mm. **Each, $ .70** **Dozen lots,** 10% discount

8-880. DISSECTING FORCEPS, Sharp Points, Straight; made of nickel-plated steel, highly polished, with inside of points file-cut. The handles are corrugated and are made with a guide-pin. Length over all, 115 mm. **Each, $ .65** **Dozen lots,** 10% discount

8-885. DISSECTING FORCEPS, Medium Points, Straight; made of nickel-plated steel, highly polished, with inside of points file-cut. These forceps are slightly heavier in construction than No. 8-880, and the points are blunt. The handles are corrugated and are made with a guide-pin. Length over all, 115 mm. This is a popular style. **Each, $ .70** **Dozen lots,** 10% discount

8-890. DISSECTING FORCEPS, Heavy, Blunt Points, Straight; made of nickel-plated steel, highly polished, with inside of points deeply file-cut. These forceps are very heavy in construction and the blunt points are carefully rounded. The handles are corrugated to insure a firm grip. Length over all, 125 mm. **Each, $ .50** **Dozen lots,** 10% discount

8-895. DISSECTING FORCEPS, Blunt Points, Straight; nickel-plated, with inside of points file-cut. Length over all, 115 mm. **Each, $ .35** **Dozen lots,** 10% discount

8-900. DISSECTING FORCEPS, Medium Points, Straight; nickel-plated. Length over all, 115 mm. **Each, $ .20** **Dozen lots,** 10% discount

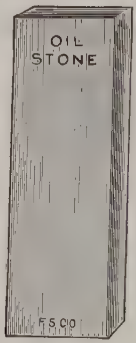
8-905. DISSECTING FORCEPS, Artery (Serrafines), Self-closing; made of nickel-plated steel, highly polished, with inside of points very finely file-cut. The handles are corrugated to insure a firm grip. The points are slightly curved, very blunt and carefully rounded. Length over all, 55 mm. **Each, $ .65** **Dozen lots,** 10% discount

DISSECTING FORCEPS, Bone-cutting. See No. 8-990 Bone-cutting Shears

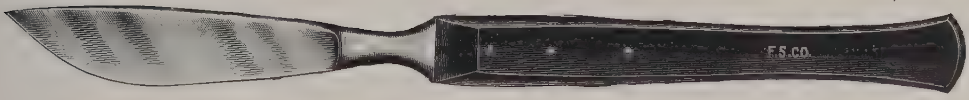
8-910

8-920

8-925



8-930



8-915

8-910. DISSECTING SCALPELS, Ebony Handles; made from properly tempered steel to retain a good cutting edge. The handles are flat and have a smooth finish. The cutting edge is curved.

Length of cutting edge, mm	25	38	45
Each	$ .50	.50	.50

Dozen lots, 10% discount.

8-915. DISSECTING SCALPEL (Prosecting Knife), Ebony Handle; for large dissections. The blade is made of highly polished steel, with extra heavy back, which is carefully finished so that the thumb can press against it firmly. The cutting edge is curved and is 85 mm. long. Length over all, 245 mm.

Each, $2.50

8-920. DISSECTING SCALPELS, All-metal, Nickel-plated; made of properly tempered steel to retain a good cutting edge. The blades of these scalpels are highly polished and the handles are nickel-plated, which makes them easily cleaned and sterilized. The cutting edge is curved.

Length of cutting edge, mm	25	38	45
Each	$ .75	.75	.75

Dozen lots, 10% discount.

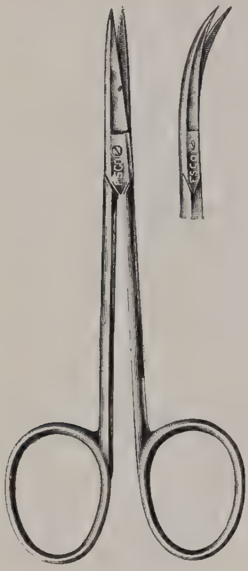
8-925. DISSECTING SCALPEL (Cartilage Knife), Extra Heavy, All-metal, Nickel-plated; made with extra heavy, wide blade for cartilage dissections. The handle is also extra heavy and corrugated to insure a firm grip. The blade and handle are made in one piece, which makes the instrument easy to clean and sterilize. Length of cutting edge, 45 mm.; length over all, 160 mm.

Each, $ .50
Dozen lots, 10% discount

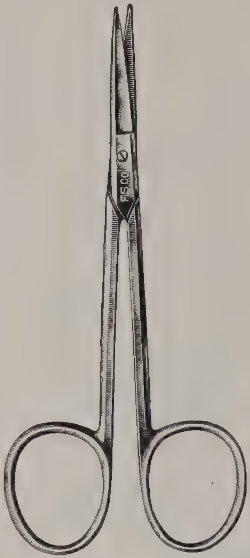
8-930. SHARPENING STONE, Oil, for sharpening scalpels and other small dissecting instruments; made from the best grade Washita. Size about 75 x 25 x 10 mm.

Each, $ .30

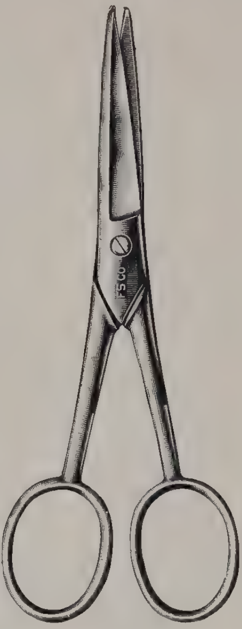
Dissecting Instruments



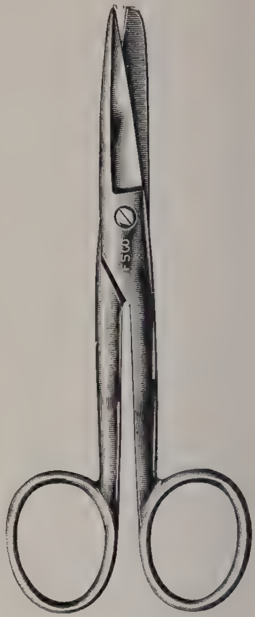
8-935



8-940



8-945



8-950

8-935. **DISSECTING SCISSORS, Sharp Points, Curved,** with narrow blades for fine cutting. Made of nickel-plated steel, highly polished and finely finished. Length of cutting edge, 25 mm.; length over all, 105 mm.

Each, $1.40

Dozen lots, 10% discount

8-940. **DISSECTING SCISSORS, Sharp Points, Straight,** with narrow blades for fine cutting. Made of nickel-plated steel, highly polished and finely finished. Length of cutting edge, 25 mm.; length over all, 105 mm.

Each, $1.10

Dozen lots, 10% discount

8-945. **DISSECTING SCISSORS, Medium Weight, Straight;** made of nickel-plated steel, highly polished and finely finished. These are the scissors which are included in our Dissecting Sets. It is very convenient for general use and is the most popular instrument of its kind. Length of cutting edge, 40 mm.; length over all, 115 mm.

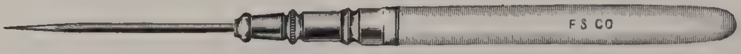
Each, $ .65

Dozen lots, 10% discount

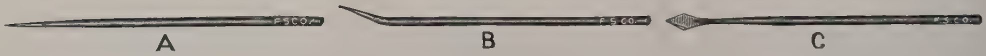
8-950. **DISSECTING SCISSORS, with One (1) Blunt End, Straight;** made of nickel-plated steel, highly polished and finely finished. These scissors are made with one blade pointed and the other blade rounded; very convenient for cutting bandages, etc. Length of cutting edge, 35 mm.; length over all, 115 mm.

Each, $1.10

Dozen lots, 10% discount



8-955



8-960

8-955. **DISSECTING NEEDLES, Adjustable, Bone Handle,** with metal parts nickel-plated and highly polished. The holder is fitted with an adjustable chuck, which tightens or loosens the steel needle. One of the advantages of this instrument is that old needles can easily be replaced and any style of No. 8-960 Needles can be fitted into it with ease. Supplied with one (1) straight steel needle; length over all, 120 mm.

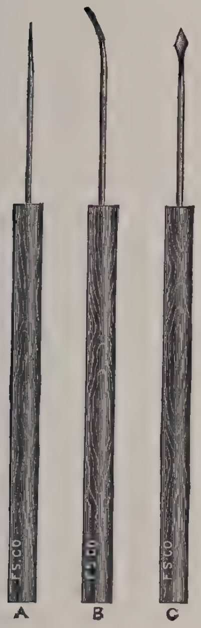
Each, $ .25

Dozen lots, 10% discount. **Gross lots,** 20% discount

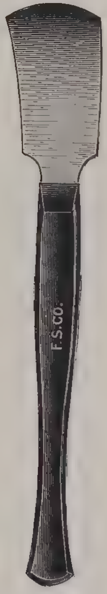
8-960. **DISSECTING NEEDLES, Steel, for use with No. 8-955 Holder.** Both the straight and bent styles have sharp points. Style "C," with spear-head, is somewhat blunter.

Style	A	B	C
Length, mm	50	50	50
Per dozen	**$ .20**	**.30**	**.40**

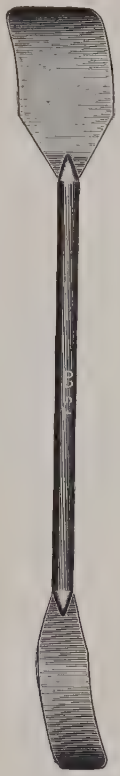
Gross lots, 15% discount.


F.S.CO.
F.S.CO.
F.S.CO.
A
B
C

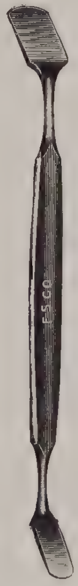
8-965



8-970



8-975



8-980

8-965. DISSECTING NEEDLES, Cedar-wood Handles. Both the straight and bent styles of needles have sharp points. Style "C," with spear-head, is somewhat blunter.

Style	A	B	C
Length of needle, mm	45	45	45
Length over all, mm	145	145	145
Per dozen	$ .60	.75	.90
Gross lots, 15% discount.			

8-970. SECTION LIFTER, Ebony Handle; made with thin flexible blade, highly polished, 22 mm. wide. Length over all, 145 mm.

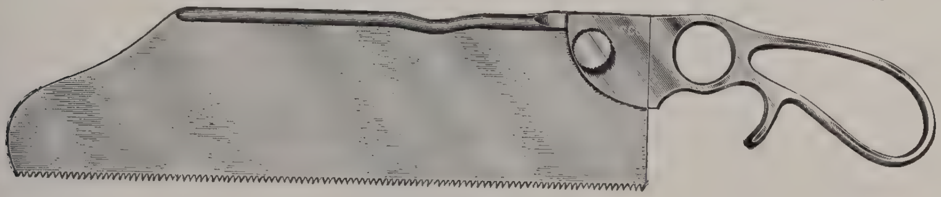
Each, $ .65
Dozen lots, 10% discount

8-975. SECTION LIFTER, Double Blade, All-metal, Nickel-plated; highly polished and well finished, with thin flexible blades 25 mm. and 13 mm. wide. Length over all, 195 mm. Easy to clean or sterilize.

Each, $ .45
Dozen lots, 10% discount

8-980. SECTION LIFTER, Double Blade, All-metal, Nickel-plated, Small Size; highly polished and well finished, with unflexible blades 10 mm. and 6 mm. wide. Length over all, 145 mm. This section lifter is made in one (1) piece and is easily cleaned or sterilized.

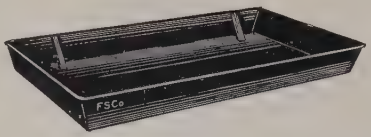
Each, $ .90
Dozen lots, 10% discount



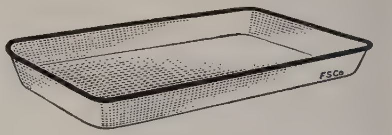
8-985

8-985. SAW, Bone-cutting, All-metal, Separable Handle; made of highly polished, nickel-plated steel. By removing the knurled-headed screw, the saw can be taken apart for cleaning and sterilization. The handle is constructed to insure a firm grip. Length of blade, 200 mm.; length over all, 290 mm. **Each, $3.75**

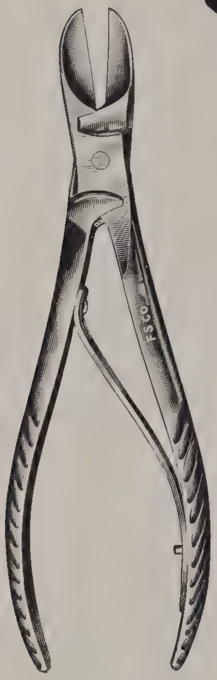
Dissecting Instruments



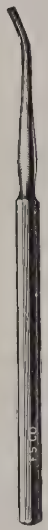
1-315



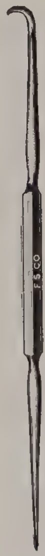
9-025



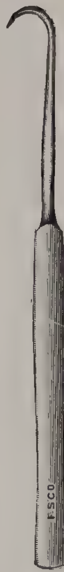
8-990



8-995



9-000



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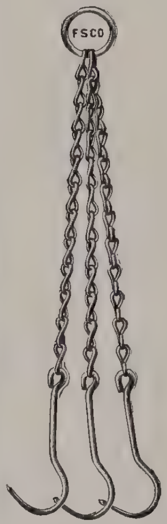
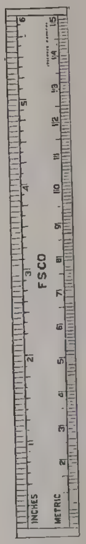


9-010

9-015



9-020

8-990. SHEARS, Bone-cutting, Separable; used tor cutting cartilage and small bones; made of nickel-plated steel, highly polished. This is a strong, substantially built instrument of the finest quality. The handles are corrugated to insure a firm grip. A strong bar-spring makes the shears self-opening. The spring is easily removed and the shears can be taken apart at the joint for cleaning and sterilization. Length of cutting blades, 30 mm.; length over all, 195 mm. **Each, $4.50**

8-995. SEEKER (Probe), Curved End, All-metal; made of nickel-plated steel, in one piece. The handle is octagonal to insure a firm grip. The curved point is tapered and blunt at the end. Length over all, 150 mm. **Each, $ .40**
Dozen lots, 10% discount

9-000. SEEKER (Probe), Straight, with Tanaculum, All-metal; made of nickel-plated steel, in one piece. The handle is octagonal to insure a firm grip; the straight point is tapered and very sharp. The tanaculum end is curved and the inside edge sharpened for cutting. Length over all, 150 mm. **Each, $ .50**
Dozen lots, 10% discount

9-005. TANACULUM, All-metal; used for lifting arteries, etc., in dissection work; made of nickel-plated steel, well finished. The hook is tapered and carefully rounded so as not to cut the arteries. The end is sharpened to a fine point. Length over all, 160 mm. **Each, $ .80**
Dozen lots, 10% discount

9-010. HOOKS AND CHAINS, Triple, Nickel-plated; consists of three (3) hooks on the chains held together by a ring. Length over all, 150 mm. **Per set, $ .35**

9-015. BLOWPIPE, Dissecting, Nickel-plated, for Zoölogical Work; inside diameter of large end, 3 mm.; inside diameter of small end, one (1) mm.; length over all, 140 mm. **Each, $ .25**
Dozen lots, 10% discount

9-020. MEASURING RULE, Dissecting, Celluloid; graduated with metric and English scales; length, 150 mm. **Each, $ .15**
Dozen lots, 10% discount

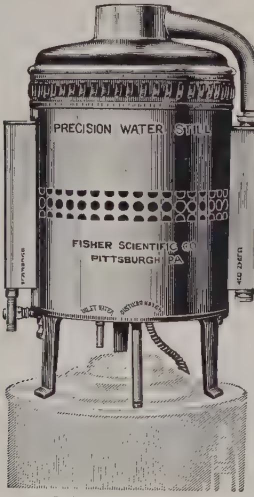
1-315. PAN, Dissecting; suitable for rats, guinea pigs or similar small animals; made of heavy, black-japanned, sheet metal. There is a cross-bar near each corner for fastening the legs of the animal. Melted wax can be conveniently poured into these pans, in the laboratory, if waxed bottoms are desired for pinning purposes. Length, 280 mm.; width, 230 mm.; depth, 35 mm. **Each, $1.25**

9-025. PAN, Sterilizing, White Enameled; used for sterilizing dissecting instruments. The enamel is baked on and the pan is easily cleaned. Length, 300 mm.; width, 200 mm.; depth, 30 mm. **Each, $1.25**

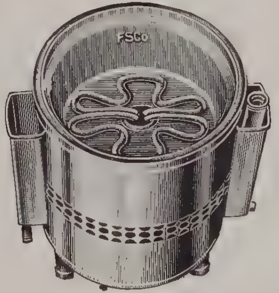
RAZOR, Dissecting. See Microtomes, page 458.

DISTILLING APPARATUS

See note at foot of page 308 regarding U. S. Internal Revenue Regulations with reference to stills.



9-030 9-035
See also No. 9-050



Showing new style electric immersion heater in No. 9-030 and No. 9-035

9-030. DISTILLING APPARATUS (Precision Water Still), with Shell Type Condenser, Electrically Heated, 110 volts, operating on either A.C. or D.C. This is a new still, designed to overcome the difficulties usually encountered in the preparation of pure, distilled water for general laboratory use. It is automatic, continuous in operation and, above all, is very easily cleaned. The Shell Type Condenser consists of an annular ring, which is completely surrounded by water, and which presents the maximum amount of distilling surface. This type of condenser does not clog like condensers made up of tubes of small diameter. The counter-current system of condensation conserves heat and produces the maximum quantity of distilled water per unit of electric current consumed. Heating by electricity insures a cool laboratory, free from the products of combustion.

Operation: The raw water is introduced through the inlet tube at the bottom and passes completely around the Shell Type Condenser as its cooling agent. This water on the outside of the condenser gradually becomes heated by absorbing the heat from the steam vapor on the inside of the condenser. Part of this preheated water, which is almost to the boiling point, rises and flows into the boiling chamber on the right side of the still, in sufficient quantity to maintain a constant water level. The remainder of the inlet water, after cooling the condenser, is discharged as surplus by means of the overflow at the left side of the still. The water is vented to the atmosphere just before entering the boiling chamber and all of the dissolved gases are eliminated. The water in the boiling chamber is vaporized and carried over through the vapor flue, through the Shell Type Condenser and is discharged as distilled water at the delivery tube. A baffle plate, in the condensing dome, acts as a steam separator and prevents water or solid matter being carried over into the condenser.

Advantages: First, a cool, clean laboratory, because of the advantages of electric heating. The electric heating-unit has an exceptionally long life and, while designed to be immersed, it does not burn out if heated for a short time when not immersed. **Second,** an automatic and uninterrupted production of chemically-pure distilled water, because the Shell Type Condenser does not clog and stop the flow of the distilled water. There are no small condensing tubes in this still. **Third,** a still whose boiling chamber is easily accessible for inspection and cleaning, because the condensing dome, connected by means of a union, is easily and quickly removed.

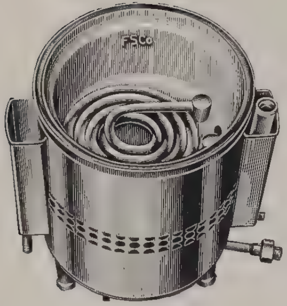
Construction: The still is made of highly polished copper. All parts which come in contact with distilled water are heavily coated with pure block-tin. In this electric still, the boiling chamber has double walls, between which is an asbestos packing to prevent loss of heat by radiation. The replaceable, electric, heating-unit is a special design of the immersion type. This heating-unit will last a very long time, provided the boiling chamber is not allowed to run dry. Its long life is one of the outstanding features of this heating-unit. There are two clean-out plugs to remove any sediment in the inlet water line, which might collect in the bottom of the still. A heavy, flexible, armored conduit, with standard BX connector, is furnished so that the electrical connection can be made to any standard outlet box through a switch. The leads must be connected directly to the power line and not into the ordinary receptacle.

These stills can be placed on top of Distilled Water Storage Tanks, No. 9-050, or they can be mounted upon the wall. A set of removable legs, and a cast-iron wall bracket are part of the regular equipment. Supplied complete, with instructions for installation and operation.

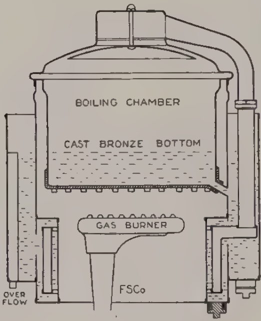
The illustration shows the No. 9-030 Still mounted on a very convenient type of storage tank which has been designed for use with these stills. Together they make a complete unit and form a fine looking equipment for the laboratory in a minimum amount of space. (*For Distilled Water Storage Tanks, see No. 9-050.*) The prices below do not include the storage tanks.

Capacity per hour, gallons	1	1½	2
Amperes required	23	34	46
Outside diameter of still, inches	11	11	14
Each (for 110 volts)	**$75.50**	**96.00**	**119.50**

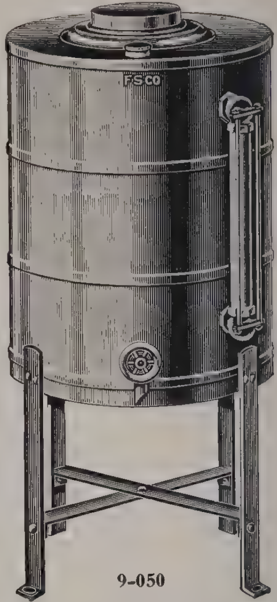
See note at foot of page 308 regarding U. S. Internal Revenue Regulations with reference to stills.



9-045
Showing steam coil



9-040



9-050

9-035. DISTILLING APPARATUS (**Precision Water Still**), **with Shell Type Condenser, Electrically Heated, 220 volts,** operating on either A.C. or D.C. Similar to No. 9-030, under which caption the details regarding this still are fully explained.

Capacity per hour, gallons	1	1½	2
Amperes required	12	17	23
Outside diameter, inches	11	11	14
Each (for 220 volts)	**$75.50**	**96.00**	**119.50**

9-040. DISTILLING APPARATUS (**Precision Water Still**), **with Shell Type Condenser, Gas Heated.** The details regarding the construction and operation of this still are similar to No. 9-030, except that the boiling chamber is single walled. The boiling chamber has a heavy cast bronze bottom and will not easily burn out. The gas burner is designed with an adjustable orifice so that it will operate on various gases.

Capacity per hour, gallons	1	2
Outside diameter, inches	11	14
Each	**$62.50**	**94.50**

9-045. DISTILLING APPARATUS (**Precision Water Still**), **with Shell Type Condenser, Steam Heated, Low Pressure.** The details regarding the construction and operation of this still are similar to No. 9-030, except that the boiling chamber is single walled. The steam coil is made of heavy seamless copper tubing, tin coated, with fittings brazed on to the coil. Although this still will operate on a steam pressure of from 4 to 8 pounds per square inch, the coil will withstand pressures up to 150 pounds per square inch. To obtain the best results, high pressure steam lines should be equipped with a gate-valve, so that the delivery pressure to the still is not more than 8 pounds per square inch. The steam coil is easily removed for cleaning.

Production of distilled water by steam heating is, by far, the most economical method and is recommended wherever a steam line is available. The low pressure required by this still makes this method of heating possible in many laboratories.

Size No.	1	2
Capacity per hour, gallons	1 to 2	2 to 4
Outside diameter, inches	11	14
Each	**$75.00**	**106.50**

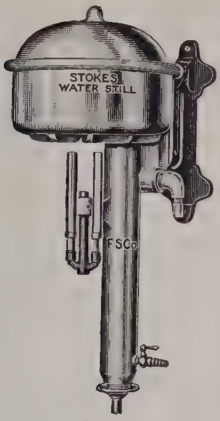
9-050. DISTILLED WATER STORAGE TANKS, Cold Rolled Copper, Tin Lined, mounted on black-enameled, iron stands. The tanks are designed to be set up in connection with Precision Water Stills No. 9-030 to No. 9-045 inclusive. The still is placed on top of the tank and connected directly to the inlet. Provision is made so that the still cannot slip off. This makes a fine looking unit in the laboratory and occupies a very small amount of floor space. These tanks can also be connected with any other types of stills and used for the convenient storage of distilled water.

All parts of the tank, which come in contact with distilled water, are heavily coated with block-tin. The outlet faucet is designed with a pure block-tin seat. A water gauge indicates the amount of distilled water in the tank. The cover is removable for inspection purposes. The iron stand is high enough from the floor to permit the withdrawal of distilled water into the usual laboratory vessels.

Distilled water storage tanks are usually selected large enough to contain at least a full day's run of the still. Storage tanks, of larger capacities than those here listed, can be supplied upon short notice.

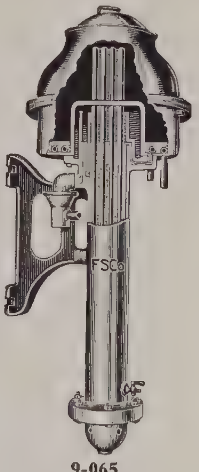
Capacity of tank, gallons	10	15	25
Diameter of tank, inches	14	15	18
Depth of tank, inches	17	20	24
Height over all, inches	27	30	39
Each	**$25.00**	**30.00**	**42.50**

STOKES WATER STILLS



9-055

See note at foot of page 308 regarding U. S. Internal Revenue Regulations with reference to stills.



9-065
See also No. 9-060

9-055. DISTILLING APPARATUS (Stokes Water Still), **Gas Heated;** for the automatic preparation of chemically pure distilled water for general laboratory use. Because the boiling chamber is made of heavy cast iron, this still cannot burn out, which makes it one of the most durable stills on the market for gas heating.

Operation: The raw water enters the condenser jacket near the lower end of the still, passes upward and surrounds the condenser tubes, thereby condensing the descending steam generated in the boiling chamber. As the water moves upward it becomes heated almost to the boiling point by the time it reaches the constant water level. At this level, the water jacket is open to the atmosphere, permitting the ammonia and other volatile matter to escape. By means of a small feed pipe, enough of this preheated water enters the boiling chamber to maintain the water level, while the surplus flows over the spill-way into the overflow pipe. The water is vaporized in the boiling chamber; the steam descends through the condensing tubes; and the distilled water is delivered at the bottom of the still.

Advantages: First, the outstanding feature of this still is its durability for gas heating. The heavy cast-iron boiling chamber cannot burn out. **Second,** it utilizes the heat generated in the still for preheating the incoming water. This makes the still economical to operate, after it is once started. **Third,** the condensing dome can be easily removed. This exposes the entire boiling chamber for cleaning.

Construction: The still body is made of heavy cast-iron. The condensing tubes are of brass, coated with pure block-tin. The inside of the condensing dome is lined with baked-on enamel, which prevents contamination of the distilled water on account of the iron. There is a sleeve, cast on the under side of the dome, which fits loosely over the end of the condenser and serves as a baffle to prevent any foam or drops of entrained liquid getting into the condenser. The still is attached to the wall by means of a heavy cast-iron bracket, which is supplied with each still.

Capacity per hour, gallons	½	¾	2¾
Number of gas burners	1	2	6
Height, inches	24	24	48
Net weight, pounds	50	50	110
Each	$25.00	27.00	60.00

9-060. DISTILLING APPARATUS (Stokes Water Still), **Steam Heated.** These stills are similar to the Gas Heated Stills No. 9-055, except that there are no gas burners and the water is vaporized by means of a copper steam coil in the boiling chamber. The terminals of the coil are fitted with standard thread nipples for direct coupling to steam supply lines.

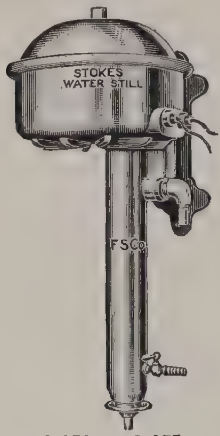
To operate these stills to capacity requires steam pressure of at least 25 pounds per square inch, but never over 30 pounds per square inch. Steam heating is the most economical method of producing distilled water and is recommended wherever suitable steam pressure is available.

Capacity per hour, gallons	¾	3
Height, inches	24	48
Net weight, pounds	50	110
Each	$30.00	75.00

9-065. DISTILLING APPARATUS (Stokes Water Still), **Steam Heated, High Pressure.** These stills will operate with a steam pressure of from 25 to 30 pounds per square inch, but will withstand steam pressures up to 240 pounds per square inch. They are built of extra heavy cast-iron and the boiling chamber is galvanized to resist corrosion. The condensing dome is made of copper and the inside is coated with pure block-tin to insure pure water. The condensing tubes are of brass, coated with block-tin, and held in position by ferrules, which permit easy replacement of the tubes. The stills are completely assembled and are ready to be attached to any standard steam line.

Capacity per hour, gallons	5	10	25
Boiler h.p. required	2	4	10
Height, inches	42	54	84
Net weight, pounds	275	325	750
Each	$150.00	200.00	300.00

(Steam Stills of greater capacity can also be supplied.)



9-070 9-075

See Note at foot of page 308 regarding U. S. Internal Revenue Regulations for stills

9-080
See also No. 9-085

9-070. DISTILLING APPARATUS (Stokes Water Still), Electrically Heated, 110 volts, operating on either A.C. or D.C. These stills are similar in appearance to the Steam Heated Stills No. 9-060, except that electric heating units are substituted for the steam coil.

The electric heating units are of the immersion type and easily replaceable. These lie on the bottom of the boiling chamber, with the terminals projecting through the side. Care must be taken to see that the heating units are completely covered with water, in which case they will last a long time. The leads must be connected directly to the power line and not to the ordinary receptacle.

Electric heating insures a cool, clean laboratory, without the products of combustion.

Capacity per hour, gallons	½	1	3
Amperes required	20	38	72
Height, inches	24	24	48
Net weight, pounds	50	50	110
Each (for 110 volts)	**$40.00**	**60.00**	**120.00**

9-075. DISTILLING APPARATUS (Stokes Water Still), Electrically Heated, 220 volts, operating on either A.C. or D.C.; similar to No. 9-070, except that the electric heating units are wound for 220 volts.

Capacity per hour, gallons	½	1	3
Amperes required	10	19	36
Height, inches	24	24	48
Net weight, pounds	50	50	110
Each (for 220 volts)	**$40.00**	**60.00**	**120.00**

BARNSTEAD WATER STILLS

9-080. DISTILLING APPARATUS (Barnstead Water Still), Electrically Heated, 110 volts, operating on either A.C. or D.C.; used for the automatic preparation of chemically pure, distilled water for general laboratory use. This type of still has been in use for a number of years and has given satisfactory service. Electric heating insures a cool, clean laboratory, free from the products of combustion.

Operation: The raw water enters the condenser jacket, passes around the outside of the condenser tubes and acts as the cooling agent. In doing this, the water gradually absorbs heat until it is almost at the boiling point. As it passes on to the boiling chamber, ammonia and other volatile matter are eliminated through a vent to the atmosphere. A constant water level is maintained in the boiling chamber and the excess water is discharged to the overflow. The water in the boiling chamber is vaporized. The steam passes on through the condenser tubes and the distilled water is delivered through a pure block-tin pipe at the end of the condenser.

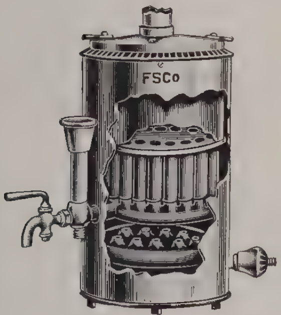
Construction: The still is made of copper, nickel-plated and highly polished. The boiling chamber and all parts coming in contact with distilled water are coated with block-tin. The boiling chamber can be quickly detached from the condenser for inspection and cleaning. The condenser consists of a number of small tubes, through which the steam passes and is condensed. The electric heating units are of the immersion type and care must be taken to see that they are always completely covered with water. They are easily replaceable. The leads should be connected directly to the power line and not through the usual receptacle.

This type of still is light in weight and is usually set upon the laboratory table or shelf, without the use of clamps or other mounting apparatus. Each still is supplied with instructions and a wiring diagram.

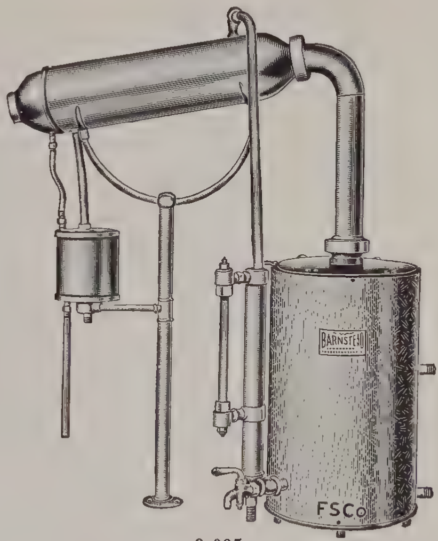
Capacity per hour, gallons	1	2	3
Amperes required	24	60	72
Height, inches	23	23	23
Inlet connection, inch	⅛	⅛	⅛
Overflow connection, inch	⅜	⅜	⅜
Each (for 110 volts)	**$77.40**	**122.50**	**152.00**

Price includes the manufacturer's packing charge

See note at foot of page 308 regarding U. S. Internal Revenue Regulations for stills



9-090
Showing the tubular evaporator type of heating arrangement



9-095

9-085. DISTILLING APPARATUS (**Barnstead Water Still**), **Electrically Heated, 220 volts,** operating on either A.C. or D.C.; similar to No. 9-080, except that electric heating units are wound for 220 volts.

Capacity per hour, gallons	1	2	3
Amperes required	12	30	36
Height, inches	23	23	23
Inlet connection, inch	⅛	⅛	⅛
Overflow connection, inch	⅜	⅜	⅜
Each (for 220 volts)	**$77.40**	**122.50**	**152.00**

Prices include the manufacturer's packing charge

9-090. DISTILLING APPARATUS (**Barnstead Water Still**), **Gas Heated**; used for the automatic preparation of chemically pure, distilled water for general laboratory use. The boiling chamber is constructed along the lines of the most approved type of tubular evaporator, presenting to the flame a maximum of heating service in a minimum of space. The outside jacket of the still acts as an insulating medium and reflects the heat from the burner against the sides of the tubes, which extend downward into the heating zone of the radial burner. An air regulator makes the burner suitable for illuminating gas. The five (5) and ten (10) gallon sizes have heavy cast-iron, outside casings. Otherwise, the general construction and operation of the gas heated stills are similar to the electrically heated stills No. 9-080.

The burners for these stills are designed for use with illuminating gas. An adjustable burner for use with natural, coal or gasoline gas can be supplied, if desired, at $2.50 more than the prices listed.

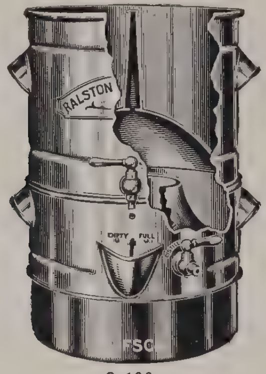
Capacity per hour, gallons	1	2	5	10
Hourly gas consumption, cu. ft	20	40	100	200
Height, inches	23	24	38	44
Water inlet connection, inch	⅛	⅛	¼	½
Overflow connection, inch	⅜	⅜	½	¾
Gas connection, inch	⅛	½	1	1½
Each	**$62.00**	**98.30**	**167.50**	**335.00**

Prices include the manufacturer's packing charge

9-095. DISTILLING APPARATUS (**Barnstead Water Still**), **Steam Heated, High Pressure.** These stills are similar in construction to No. 9-080, except that the steam coil is substituted for the electric heating units. It requires a steam pressure of about 60 pounds per square inch to operate the stills at the full rated capacity. Higher pressures, up to 150 pounds per square inch can be safely used, the capacity of the still varying with the increase or decrease of pressure. Steam heating is the method recommended where suitable steam pressure is available, because this is the most economical method of producing distilled water. Barnstead stills, with a capacity of five (5) gallons per hour, or over, are built upon heavier and more rugged lines. On these large stills, an additional automatic cooler is placed between the condenser and the delivery tube, to lower the temperature of the distilled water, before delivery.

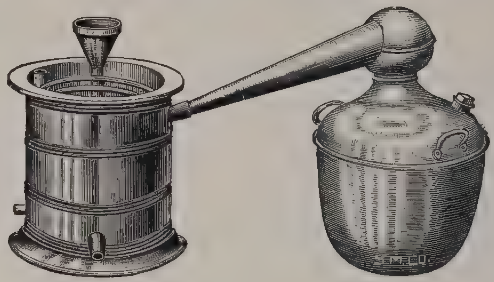
Capacity per hour, gallons	1	2	5	10	25
Steam consumed per hour, pounds	9½	19	48	95	240
Height, inches	23	26	26	42	64
Water inlet connection, inch	⅛	⅛	¼	½	½
Overflow connection, inch	⅜	⅜	½	¾	1¼
Steam inlet connection, inch	⅜	⅜	⅜	½	¾
Steam outlet connection, inch	¼	¼	¼	⅜	½
Each	**$74.10**	**106.50**	**159.00**	**230.00**	**485.00**

Prices include the manufacturer's packing charge



9-100

See note at foot of this page



9-105

9-100. DISTILLING APPARATUS (Ralston Water Still), Reservoir Type. This is a simple apparatus for the preparation of a small quantity of distilled water. It is designed to be used over any gas burner or hot plate and cannot explode, because steam is not generated under pressure and a current of air is constantly passing through the still while in operation.

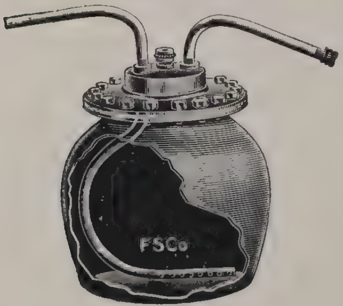
The still consists of three compartments; first, a boiling chamber to contain the raw water; second, a condensing chamber for condensing the steam and accumulating the distilled water; and third, a chamber for cold water to act as the cooling agent over the dome of the condensing chamber. The distilled water in the reservoir is drawn off as needed by means of a stopcock. When the reservoir is full the distilled water automatically returns to the boiling chamber by means of an overflow and thereby prevents the still from boiling dry. An automatic indicator shows whether the boiling chamber is full or empty. When the cooling water becomes hot, it is drawn off through a stopcock on the outside of the still and replaced by fresh water.

All parts are made of heavy cold-rolled copper. The inside is tinned throughout and the outside above the boiling chamber is nickel-plated and highly polished. Height over all 14 inches; outside diameter 9 inches; capacity per hour about one (1) quart. **Each, $15.00**

9-105. DISTILLING APPARATUS, Retort Style; consists of a copper retort and a zinc condenser. An opening in the side of the retort, which is closed by a screw plug, provides a means for adding additional liquid while the distillation process is in progress.

The retort is made of heavy, polished copper and lined with pure block-tin. The removable ball-head acts as an additional foam chamber to prevent undistilled liquid from passing over into the condenser. The condenser is of heavy zinc, which does not rust, and is fitted with a pure block-tin condensing tube. The cooling water enters through the funnel-topped tube, is conveyed to the bottom and leaves through the overflow tube which maintains a large volume of water at a constant level. If desired, ice may be used instead of the cooling water.

Capacity of retort, gallons	1	2	3
Each	**$19.75**	**23.50**	**31.50**



6-938

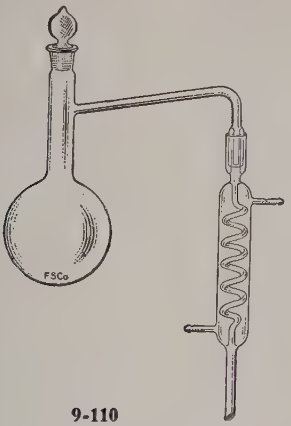
6-938. DISTILLING APPARATUS, Steam; used in the distillation of heavy oils, etc., requiring agitation with great heat during distillation. The steam line extends to the extreme inside bottom of the retort allowing the steam to escape through a number of small holes. Distillation can also be made by direct heating, with or without agitation by hot air blown through the steam line. The steam line can also be removed and the aperture closed by means of a knurled screw, so that the apparatus can be used as a simple retort if desired. The apparatus is made of heavy copper with brass fittings and has a capacity of about one (1) gallon. **Each, $30.00**

REGARDING U. S. INTERNAL REVENUE REGULATIONS

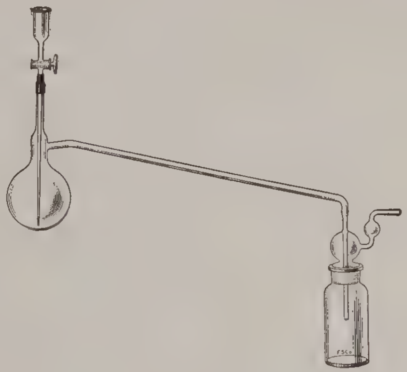
"Any still, worm or condenser, of whatever size or capacity, with the exception only of retorts for production of wood alcohol, and glass laboratory stills of trivial capacity"—may be shipped only after receipt of a sworn statement from the user.

We supply all the forms and the necessary information for the execution of this affidavit.

Under the regulations in force at this time, it matters not that the water stills with continuous circulation through the condenser and boiler, could not be used for distilling spirits, the affidavit is required by the Revenue Department.



9-110



9-125

9-110. DISTILLING APPARATUS, Maharg; used for the determination of ammonia in water. For method, see American Public Health Association, *Standard Methods for the Examination of Water and Sewage.*

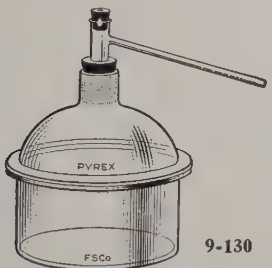
The apparatus consists of a round bottom, glass distilling flask containing about 1000 ml., having a glass stopper ground in the neck. The end of the delivery tube is made to form a mercury-seal with the adapter end of the glass condenser. The condenser is of the sealed type and is equipped with a coiled condensing tube. The condenser measures about 150 mm. from shoulder to shoulder. **Each, $7.75**

9-115. DISTILLING FLASK, for No. 9-110 Distilling Apparatus; made with a ground glass stopper; capacity about 1000 ml. **Each, $4.50**

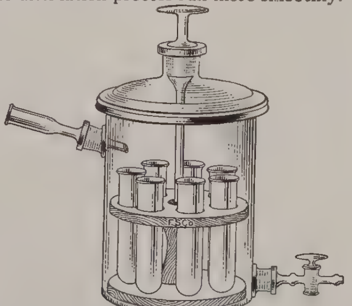
9-120. GLASS CONDENSER, for No. 9-110 Distilling Apparatus; made with mercury-seal adapter; length from shoulder to shoulder about 150 mm. **Each, $3.50**

9-125. DISTILLING APPARATUS, Hulett, for mercury distillation under vacuum. For method, see *U. S. Bureau of Mines, Bulletin No. 42.*

The apparatus consists of a round bottom flask, 500 ml. capacity, connected by means of a sealed condensing tube to a Drechsel Wash Bottle, 500 ml. capacity, which is used as the receiver. In the neck of the distilling flask is a filling tube fitted with a glass stopcock. This is used to add more mercury without interrupting the distillation process. The filling tube is made gas-tight in the neck of the flask by means of a piece of Scimatco rubber tubing. The distillation can proceed under vacuum with the stopcock closed. By opening the stopcock slightly, a small current of air can be introduced through the boiling mercury. This equalizes the pressure inside the flask and makes the distillation process run more smoothly. The extreme width of the complete apparatus is about 62 cm. **Each, $8.50**



9-130



9-140

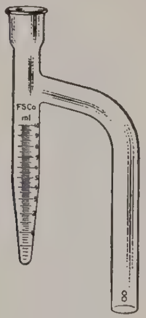
9-130. DISTILLING APPARATUS, Low Vacuum, Pyrex Glass; used for making evaporations and distillations under reduced pressure, but not for high vacuum work. This apparatus can be used in connection with a Bruehl Distillation Receiver No. 9-140. The apparatus consists of three glass parts, a heavy Pyrex glass receptacle with a broad ground rim, a Pyrex glass dome with broad ground flange and a glass distilling tube. The Pyrex glass receptacle measures approximately 155 mm. inside diameter, is 100 mm. deep and has a capacity of about 2000 ml. This makes an air-tight connection with the Pyrex glass dome by means of the ground glass joint between the two glass parts. The distilling tube fits through a rubber stopper in the tubulature of the Pyrex glass dome. The rubber stopper in the distilling tube is for the insertion of a thermometer. Supplied with rubber stoppers, but without thermometer or distillation receiver. **Each, $8.50**

9-135. DISTILLING TUBE, Pyrex Glass for No. 9-130 Low Vacuum Distilling Apparatus; made of glass with delivery tube set at a 75° angle. **Each, $1.00**

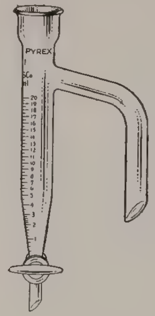
9-140. DISTILLATION RECEIVER, Bruehl; for collecting the successive fractions of a condensate from a vacuum distillation, without interrupting the distillation process.

The apparatus consists of a heavy glass jar 150 mm. diameter and 200 mm. high, with tubulated cover ground to fit the heavy, broad rim of the jar. There are two tubulatures in the jar, one with a ground-in adapter for receiving the condensate and the other with a glass stopcock, which is ground into the tubulature. The vacuum line is attached to this stopcock. The tubulature in the cover is fitted with a ground-in glass handle used to revolve the wooden support for the glass receiving tubes. The wooden support holds seven (7) receiving tubes 30 x 120 mm. at one time.

Supplied complete, with fourteen (14) glass receiving tubes 30 x 120 mm. **Each, $15.00**



9-145

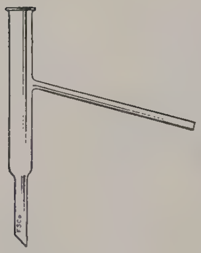


9-150

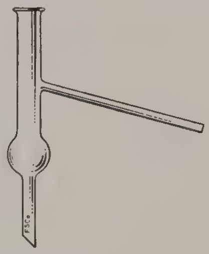
9-145. DISTILLING TRAP, A.S.T.M. Water Test; used to determine the water existing in a sample of petroleum products or bituminous materials by distilling the sample with a volatile solvent. For method, see A.S.T.M. *Standards for 1924, Serial Designation: D 95-24.*

The trap consists of a graduated tube, with a conical bottom and connecting tubes for attachment between a still and a vertical condenser. This trap collects and measures the condensed water, the solvent overflowing and returning to the still. The graduated portion of the trap is calibrated from zero to 10 ml. in 0.1 ml. divisions. Length of distilling trap over all, 160 mm. (*A round bottomed distilling flask, with a short ring neck, is usually used as the still for petroleum products and a metal still, as shown under Asphalt Testing Apparatus, for road materials and tars. The condenser may be the usual 400 mm. Liebig form, with sealed-in condensing tube.*) **Each, $1.25**

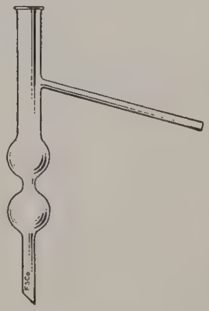
9-150. DISTILLING TRAP, Barrett Water Test, Pyrex Glass, with stopcock; used to determine the water existing in a sample of petroleum products or bituminous materials by distilling the sample with a volatile solvent according to the Barrett Methods. The use of this trap is similar to that of A.S.T.M. Distilling Trap, No. 9-145. The Barrett Trap has the advantage of a stopcock by means of which the measuring tube can be emptied if desired. This tube is graduated to 20 ml., the first 3 ml. of which is divided into 0.2 ml. and the remainder into 0.5 ml. divisions. The entire trap, including the stopcock is made of Pyrex glass Length over all, 7⅜ inches. **Each, $4.50**



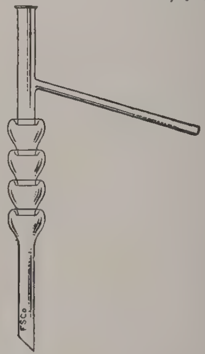
9-155



9-160
One Bulb



9-160
Two Bulb



9-165

9-155. DISTILLING COLUMN, Plain Form; made of glass with the delivery tube set at a 75° angle; used as a connector between the still and the condenser. This column is recommended only where a small amount of refluxing is desired. The lower end is ground to a 45° angle. Diameter of lower portion, 13 mm.; diameter of upper portion, 22 mm.; length over all, 225 mm.* **Each, $ .35**

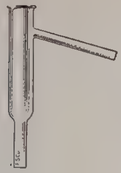
9-160. DISTILLING COLUMNS, Bulb Form; made of glass with the delivery tube set at a 75° angle; used for fractional distillations where an enlarged reflux area is desired. The lower end is ground to a 45° angle. The lower portion of the tubes is 13 mm. diameter; the upper portion is 22 mm. diameter and the bulbs are 40 mm. diameter.

*Number of bulbs	1	2
Length over all, mm	235	250
Each	**$ .45**	**.55**

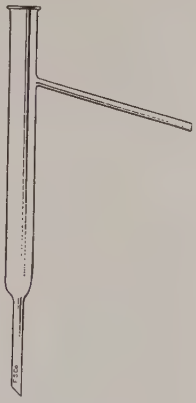
9-165. DISTILLING COLUMNS, Pear-shaped Bulbs; made of glass with the delivery tube set at a 75° angle; used for fractional distillations where a great amount of reflux area is desired. Because of the inverted pear-shaped bulbs, the reflux tends to accumulate at the lower end of the bulbs. This produces closer cuts and a better scrubbing of the vapor stream.

*Number of bulbs	4	12
Length over all, mm	335	650
Each	**$2.50**	**6.00**

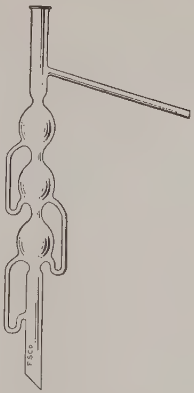
**Sizes recommended by the American Chemical Society, Standardization Committee.*



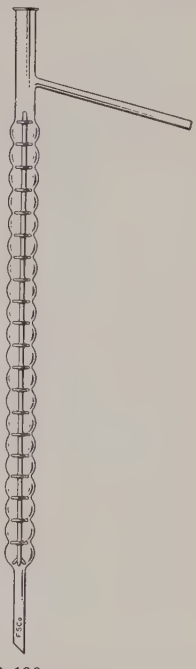
9-170



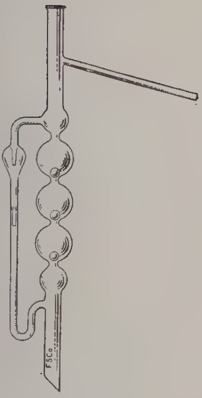
9-180



9-185



9-190



9-175

OTHER DISTILLING APPARATUS

DISTILLING APPARATUS, for Ammonia.
See Nitrogen Determination Apparatus

DISTILLING APPARATUS, for Benzol, for Coal, for Road Materials, also for **Wash Oils.**
See Coal and Coal By-Products Testing Apparatus

DISTILLING APPARATUS, for Gasoline
See Petroleum and Petroleum Products Testing Apparatus

DISTILLING APPARATUS, for Creosote Oils, also **Road Materials**
See Asphalt Testing Apparatus

9-170. DISTILLING COLUMNS, Barrett, Resistance Glass; with delivery tube set at a 75° angle. This is a modified form of the Hempel Distilling Column, adapted for the fractional distillation of light oils according to the Barrett Methods. In operation, these columns are filled with glass beads. The resistance glass is carefully annealed to withstand temperatures up to 360° C. For fuller description, see Coal Testing Apparatus.

Length over all, inches	6¼	7½
Inside diameter above construction, inch	9/16	1
Each	$ .85	.95

9-175. DISTILLING COLUMN, Glinsky, with glass valves and pressure equalizing line; made of glass with the delivery tube set at a 75° angle. Each of the three larger bulbs is fitted with a hollow glass ball-valve, which permits the vapor to pass upward, but keeps a small quantity of the liquid in the bottom of each bulb. As the vapor rises, it is washed by the reflux liquid at each of the valves and is fractionally condensed or relieved of the heavy constituents while the lighter vapor passes on. The pressure-equalizing-line equalizes the slight pressure within the still due to the weight of the glass valves and renders the distillation process more even by choking down the rushes of vapor between the top and bottom of the column. Length over all, 380 mm.* **Each, $4.00**

9-180. DISTILLING COLUMN, Hempel, for glass beads; made of glass with the delivery tube set at a 75° angle. The column consists of a straight glass tube, with a constricted end ground to a 45° angle. For fractional distillations, the tube is usually partially filled with glass beads. Length over all, 400 mm. Supplied without glass beads.* **Each, $2.00**

9-185. DISTILLING COLUMN, Le Bell-Henninger, with syphon tubes; made of glass with the delivery tube set at a 75° angle. Each bulb may be fitted with a perforated aluminum or platinum foil strainer to act as an additional distilling surface. The reflux from one bulb will collect on the foil and overflow to the foil below. As the foil bobs up and down, it effects a thorough washing of the vapor. The six-bulb size is recommended for fractionating light oils, solvents, benzines, etc. Supplied without strainers.

*Number of bulbs	3	6
Length over all, mm	400	550
Each	$3.50	4.75

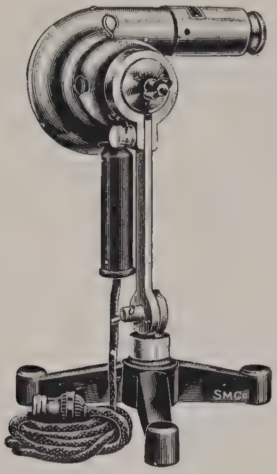
9-190. DISTILLING COLUMN, Young, Twenty Bulb; made of glass with the delivery tube set at a 75° angle. This column has inserted in it, a glass rod with discs fused on at points corresponding to the constrictions between the bulbs. Each disc serves to trap liquid at the constriction, forming a seal through which the ascending vapor must pass. One distillation made with this column is equivalent to about twenty (20) successive fractional distillations. Length over all, 650 mm.* **Each, $9.00**

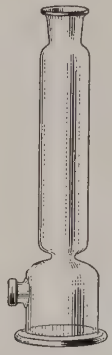
DISTILLING FLASKS. See Flasks, pages 347-349.

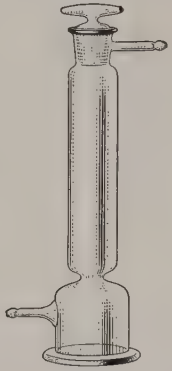
DISTILLING TRAPS, for the rectification of alcohols and the fractionation of oils, by fractional condensation. See No. 13-557 and 13-558, page 492.

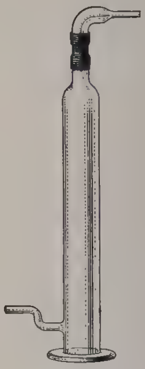
**Sizes recommended by the American Chemical Society, Standardization Committee.*

DRYING APPARATUS


9-195
See also 9-200


9-205


9-210


7-380

9-195. DRYING APPARATUS, Warm Air—Electric. This is a neat and compact motor, blower and heater combined; in polished aluminum housing; mounted on a heavy tripod support, which is adjustable to many angles. The main support can be held in different positions and the blower can be tilted to direct the air as desired. The air blast is controlled by one combination switch; with one setting of the switch, the apparatus blows hot air; with another setting, it blows air at room temperature; and with a third setting, the blower is stopped. This apparatus is useful for hastening many drying operations in the laboratory, including drying glassware, especially large flasks, for hastening evaporations, for drying metallographic specimens, for supplying a current of air for a drying oven, etc. The dryer can be taken off the support and held in the hand (see No. 9-200). The motor operates on 110 volts A.C. or D.C. and the apparatus is supplied with cord and plug for attachment to lamp socket. **Each, mounted on support, $22.50**

9-200. DRYING APPARATUS, Warm Air—Electric, without support, similar to No. 9-195, with the handle, but without the support. This style is convenient for carrying about and for directing the air into different apparatus. **Each, without support, $18.00**

DRYING AND ABSORPTION JARS AND TUBES

While the principal use of these jars and tubes is for drying with calcium chloride, they are equally well adapted for use with any solid absorbent.

They are very convenient for making up trains, etc., in the laboratory where solid absorbents, such as Ascarite No. 7-570, Activated Charcoal Nos. 5-685 and 5-690, Wilson Soda Lime No. 9-250, or Silica-Gel, are used.

Other styles of drying and absorption jars and tubes, are listed under Combustion Apparatus No. 7-370 to No. 7-570.

9-205. DRYING JARS, for Calcium Chloride, or other solid absorbents, used for drying or purifying gases. These jars have wide necks at top and tubulatures at the bottom; to be used with rubber stoppers. Stoppers are not supplied under this number.

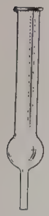
Height, mm	250	300
Each	**$1.50**	**1.80**

9-210. DRYING JARS, Glass Stoppered, for drying or purifying gases; with connections for rubber tubing at top and bottom. These jars have hollow glass stoppers, ground to fit the necks, with a hole corresponding to the outlet tube. A quarter-turn of the stopper seals the top of the jar.

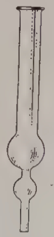
Height of jar, mm	250	300
Each	**$3.25**	**3.75**

7-380. DRYING JAR, Johnson, for drying or purifying gases with calcium chloride, phosphoric acid, stick potassium hydroxide, or other solid absorbents. Often used in trains; the outlet of one jar being connected to inlet of the next jar by means of a glass tube held to the jars by rubber tubing. The head and outlet tube is a separate piece and is connected to the jar by means of rubber tubing; this jar was designed to avoid the use of rubber stoppers. Height of jar 275 mm. Jar, with separate head and rubber connection. **Each, $2.00**

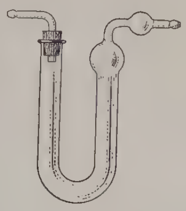
DRYING OVENS. See Ovens, pages 479-481.



9-215



9-220



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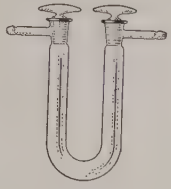
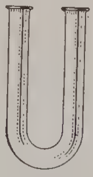
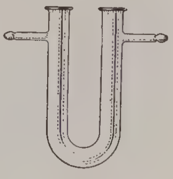


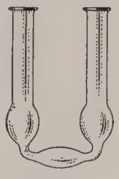
9-230



9-235



9-240



9-245

DRYING TUBES

All of the following Drying Tubes are made to the dimensions recommended by the A.C.S. Standardization Committee; the connecting tubes are uniform and have been designed to make their use more convenient.

9-215. DRYING TUBE, Straight, one bulb. Lengths given do not include the stems which are 40 mm. long by 6 mm. outside diameter.

Length, body and bulb, mm.	100	150	200
Each	$ .15	.18	.20

Dozen lots, 20% discount.

9-220. DRYING TUBES, Straight, two bulbs. Lengths given are for the body and bulbs, but do not include the stems which are 30 mm. long by 6 mm. outside diameter.

Length, body and bulbs, mm.	100	150	200
Each	$ .20	.24	.28

Dozen lots, 20% discount.

9-225. DRYING TUBE, Marchand, U-shape, with two bulbs, rubber stopper and inlet tube. The bulbs act as separating traps to retain fine particles carried by the gas. Height of U-tube, to the top of the large bulb, 150 mm., inside diameter of tube, 16 mm. **Each, $ .60**

9-230. DRYING TUBES, Schwartz, U-shape, glass stoppered, with side-tubes, and perforated ground glass stoppers, by means of which the tube can be sealed. Often used for weighing, by attaching a fine wire to the side-tubes and suspending from the stirrup-hook of a balance. Side-tubes are 40 mm. long by 6 mm. outside diameter and are shaped to hold rubber tubing; heights given are for the tubes without the glass stoppers.

Height of tube, mm.	100	150
Each	**$1.20**	**2.00**

9-235. DRYING TUBES, Plain, U-shape. The tops are flared and fire finished.

Height, mm.	100	150	200
Diameter, inside, mm.	14	16	18
Each	$ .25	.30	.40

Dozen lots, 15% discount.

9-240. DRYING TUBES, U-shape, with side-tubes. The side-tubes are 40 mm. long by 6 mm. outside diameter and shaped to hold rubber tubing.

Height of tube, mm.	100	150	200
Diameter, inside, mm.	14	16	18
Each	$ .35	.45	.70

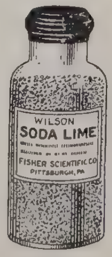
Dozen lots, 15% discount.

9-245. DRYING TUBE, Peligot, U-shape, three bulbs. With this tube, two or three different absorbents can be used at the same time; a liquid absorbent can be used in the lower bulb. Height of tube, 150 mm.; inside diameter, 16 mm. **Each, $ .65**
Dozen lots, 10% discount.

9-250. WILSON SODA LIME, Adjusted Moisture Content, non-deliquescent; for the purification of gases by absorption of the impurities. This soda lime is particularly recommended for use in Drying Jars and Tubes No. 9-205 to No. 9-245.

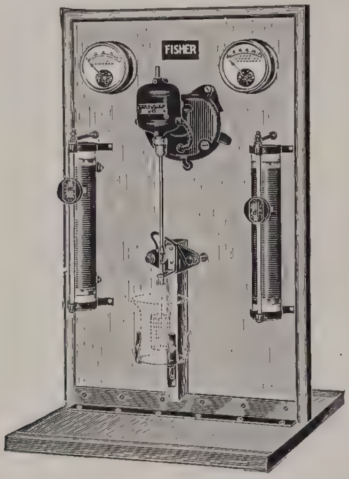
The lime is made of a charcoal base, 8 to 14 mesh, impregnated with soda-lime and a low percentage of permanganate. While this absorbent was developed originally as a gas mask absorbent for war purposes, its uses in industry are becoming more and more numerous. It is already being used for the absorption of chlorine, sulphur dioxide, hydrochloric acid fumes, phosgene, hydrocyanic and similar acid fumes. As the moisture content of this absorbent has been adjusted, it is not deliquescent and will not "drip" or become clogged in use. It is hard and will withstand rough handling without crumbling into a large number of "fines" which clog the spaces between the granules and increase the resistance to the flow of gas. This soda lime will absorb 25 to 40% of its chemical equivalent of gas and will retain all traces of gas when used in a two to three inch layer with the gas velocities ordinarily encountered in analytical work (less than two lineal feet per minute).

Supplied in one (1) pound bottles; price includes the bottle. **Per pound, $1.00**



9-250

ELECTRO-CHEMICAL APPARATUS



9-260 9-265

FISHER
ELECTROLYTIC ANALYSIS APPARATUS

9-270

9-260. ELECTRO ANALYZER, Fisher; for use with 110-volt alternating current. Alternating current of 110 volts has become the standard and is almost universally used for lighting. Most laboratories have been confronted with the necessity of installing a motor-generator set to provide direct current, before they could equip for making electro analyses. The cost of a good motor-generator set is as much as that of the entire equipment for making the analyses.

This apparatus does not require a motor-generator set. The plug can be attached to the lamp socket on any regular 110-volt A.C. line in the laboratory and the apparatus used for the electrolytic analysis of brass, bronze, amalgams and similar alloys.

Gold, silver, platinum, cadmium, zinc, lead, nickel, copper, tin, antimony and mercury can all be determined with this apparatus in a fraction of the time required to make the same determinations by the usual chemical methods.

Construction. The entire apparatus is mounted on a panel 31½ inches high with a substantial and stable base, 19x22 inches. It contains the apparatus for rectifying the alternating current; two adjustable resistances for controlling both the amperage and the voltage of the electrolytic current; an ammeter and a voltmeter which indicate the current density at the electrodes; a motor with speed control for rotating the anode (or cathode); a current reversing switch for making the rotating electrode either the anode or the cathode; and an adjustable support for the beaker containing the electrolyte. If desired, a heater can be placed under the beaker support. The entire outfit is a carefully designed unit, built in our own Instrument Shop. The workmanship throughout is in keeping with the other high-class instruments which we manufacture.

Features. It operates directly on the ordinary 110-volt alternating lighting circuit. The rectifying apparatus operates automatically and requires no time or attention whatever.

Electrodes of different materials and different shapes such as No. 9-280 to No. 9-305 can be used, or the usual platinum crucibles or dishes, to be found in most laboratories, can be used. Mercury Cathode Cell No. 9-270 can also be used.

The time required for electrolytic separations is materially reduced by the rotation of the electrode of this apparatus; the speed of rotation can be controlled by the motor rheostat. By throwing the switch on the panel, the current is reversed and the rotating electrode is made, either the anode or cathode, as desired.

The amperage and voltage of the electrolytic current can be interdependently controlled by adjusting the resistances and balancing the system. This is done in a manner similar to that employed in tuning a radio receiving set. Different currents up to three (3) volts and nine (9) amperes or nine (9) volts and three (3) amperes can be obtained. This provides ample range of currents so that the optimum current for every separation is available. The optimum current is different for each type of analysis and varies with the nature, concentration, temperature and degree of agitation of the solution; it also varies with the nature, area and distance between the electrodes. The ability to obtain the optimum current for every separation is a most desirable feature, and is a special one embodied in the design of this apparatus.

Fisher Electro Analyzer as described, without electrodes; for use on 110 volts A.C. **Each, $225.00**

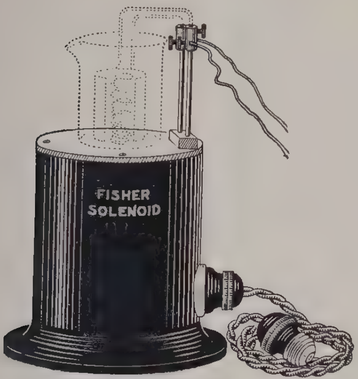
Multiple units can be made to order.

9-265. ELECTRO ANALYZER, Fisher; for use with 110-volt direct current. This apparatus is similar to No. 9-260, but is designed to operate on direct current instead of alternating current. The current rectifying system is replaced by a current reducing system.

Apparatus, without electrodes; for use on 110 volts D.C. **Each, $225.00**

Multiple units can be made to order.

9-270. CATHODE CELL, Mercury. This cell is a lipped, glass container, into the side of which is fused a platinum electrode. The electrode is to be covered with sufficient mercury. The entire surface of the mercury then becomes an electrode. By using this in certain electrolysis, an alloy of the mercury and the cation is effected. This alloy can then be analyzed or it can be used for plating. Capacity of cell, 150 ml.; supplied without mercury. **Each, $3.00**



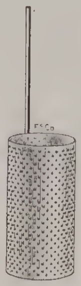
9-275

9-280

9-285

9-290

9-295



9-300

9-305

9-275. SOLENOID for Electrolytic Analysis, Fisher; for use with 110-volt direct current. Used for the rapid electrolytic analysis of metals, alloys, etc., without the use of a mechanically rotated electrode.

This apparatus has a specially designed solenoid which produces a magnetic field in a solution contained in a beaker placed on top of it. As the electrolyzing current is passed between the electrodes in the solution, a torque is exerted on the liquid causing it to rotate. With stationary gauze electrodes (see Nos. 9-280 to 9-300) this apparatus will deposit a metal in less time than that required with the ordinary, non-agitated analyzer. As heat is generated in the solenoid, the solution becomes warmed and facilitates the deposition of the metal.

With the Fisher Solenoid, the solution is always visible. This permits the progress of the separation, nature of the deposit and condition of the electrodes, to be easily observed, and the rate of electrolysis controlled. The electrolyzing current can be obtained from the same line as the solenoid current, but must be reduced to the proper strength by a suitable lamp bank or rheostats. For electrodes for use with this Solenoid, see No. 9-280 to No. 9-300. Solenoid only with cord and plug but without beaker or electrodes.
Each, $38.00

REGARDING PLATINUM ELECTRODES

The price of platinum fluctuates and, for this reason, we cannot print the prices of the following Electrodes. They are sold by the gram at the current price for the particular shape, at the time the order is received. The weights given are approximate and the weight of each particular Electrode will vary somewhat from this approximation.

9-280. ELECTRODE, Platinum, Coil. Made of wire; diameter of coil, ⅝ inch; height over all 5 inches; weight, about 7 grams. **Price on application**

9-285. ELECTRODE, Platinum, Spiral. Made of wire with spiral in the horizontal plane; diameter of spiral, one (1) inch; height, 5 inches; weight, about 10 grams. **Price on application**

9-290. ELECTRODE, Platinum, Cylinder. Made of sheet and wire; all joints and seams are welded; no rivets or gold solder are used. This is frequently used as the cathode, with No. 9-280 as the anode. The cylinder is one (1) inch diameter and 2 inches high; the height over all is 4 inches; weight, about 11 grams. **Price on application**

9-295. ELECTRODE, Platinum, Split Cylinder. This electrode is similar to No. 9-290 in shape, dimensions and method of construction, but the cylinder is split to permit it to be spread to conform to different anodes which may be used with it. Weight, about 11 grams. **Price on application**

9-300. ELECTRODE, Platinum, Perforated Cylinder, Stationary Form. Perforated electrodes offer the following advantages over the solid ones: greater uniformity of current density; freer escape of the gases; larger capacity for working current density, thus reducing the time required for separations.

The cylinder is one (1) inch diameter and 2 inches high; height, over all, 4 inches; parts are welded; no rivets or solder used. Weight, about 12 grams. **Price on application**

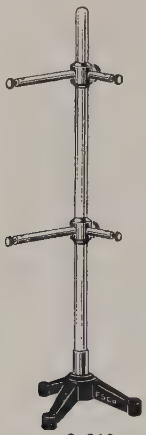
9-305. ELECTRODE, Platinum, Perforated Cylinder, Rotating Form. This electrode is similar to No. 9-300 in shape, dimensions and method of construction, but the stem is in the center so that it can be rotated with the stem as the axis. The combination of the perforated features mentioned under No. 9-300 and the reduction in time required when the anode is rotated, make this type electrode a most efficient one. Weight, about 19 grams. **Price on application**

ELECTRODES, Platinum Dishes or Crucibles. A platinum crucible makes a most efficient electrode when attached to the spindle of the motor of No. 9-260 Fisher Electro Analyzer.

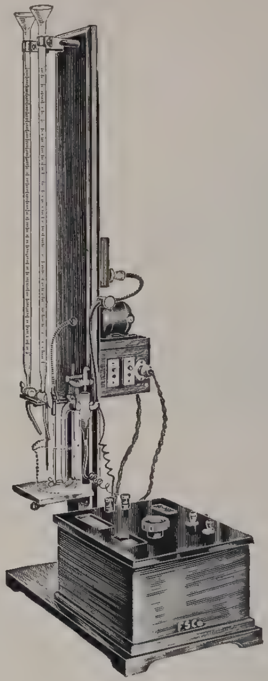
A platinum dish can be used as the container and an electrode. Because of the large electrode surface exposed in this manner, the current density can be increased and separations made in less time.

The use of crucibles and dishes as electrodes avoids the extra expense of special electrodes, as such crucibles and dishes are necessary for many other laboratory operations.

For Platinum Crucibles, see No. 8-030. **For Platinum Dishes,** see No. 8-717 to No. 8-719.



9-310



9-315

9-310. ELECTRODE SUPPORT, for holding electrodes in a fixed position during an electrolytic analysis, plating, etc. The support has a heavy glass supporting rod 18 inches long mounted on a heavy cast-iron base. On the rod are two adjustable electrode holders fitted with binding posts. The glass rod, while serving as a support for the electrode holders, insulates the electrodes from the ground and from each other. Support is supplied complete, with two nickel-plated electrode holders. **Each, $5.75**

ELECTRODE SUPPORT, Rotating, see Stirrer No. 14-500, page 532.

9-315. ELECTROMETRIC TITRATION APPARATUS, Eppley; for use in volumetric analysis. In volumetric analysis the end point of a titration is usually indicated by a change in color of the liquid itself or of an indicator added to the liquid. In some cases, however, the color of the liquid does not change or the color of the indicator may be masked by the color of the solution. In such cases, the end point can be determined by this apparatus. The neutral end point is determined with this apparatus by noting the change in potential difference as equal proportions of the standard solution are successively added; a sudden change in potentiometer reading indicates this end point. Different degrees of acidity, or hydrogen ion concentration, can be determined by comparing the potentiometer readings obtained with the unknown solution, to those obtained with known solutions.

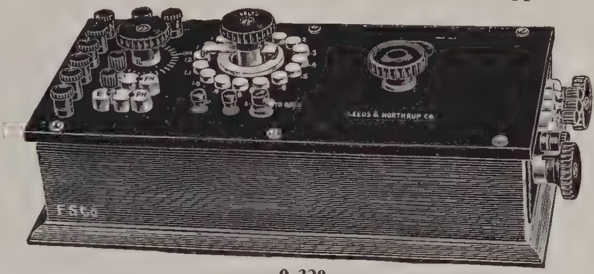
The Eppley Titration Apparatus operates on the principle of a Wheatstone Bridge. Two fixed resistances form two of the branches; the potentiometer from the zero point to one end, forms the third branch; the galvanometer, the liquid under test, and a variable portion of the potentiometer on the other side of the zero point, form the fourth branch. The liquid to be tested is placed in a beaker and the circuit closed by raising the beaker until the electrodes are immersed. For oxidation reduction titrations, the platinum and calomel electrodes are used, while for acidimetric and alkalimetric titrations the connections to the electrodes are reversed and the platinum electrode replaced by the Hildebrand hydrogen electrode. This apparatus may also be used to measure electromotive force in volts. A standard cell of known E.M.F. (No. 9-350 or No. 9-355) is substituted for the liquid and the potentiometer and a fixed resistance then calibrated in terms of this. By substituting an unknown E.M.F. for the standard cell, its value can then be determined in terms of the calibrations.

This apparatus consists of a potentiometer; galvanometer; three platinum electrodes; one (1) calomel electrode and one (1) hydrogen electrode; two burettes; motor for stirring and an adjustable beaker support, all mounted on a single base. **The Potentiometer** is the circular slide-wire type, 15 inches in diameter and so connected that a point about 4½ inches from one end represents the zero point of the circuit. All divisions on one side of this represent electromotive forces in one direction, while those on the other side represent forces in the other direction. A scale at the top is divided into 200 divisions to permit of accurate reading. **The Galvanometer** is the reflected image type, with a sensitivity of 50 megohms. The image of the lamp filament moves across a translucent scale near the potentiometer scale. **The Electrodes.** Three electrodes are supplied. The calomel electrode is of the standard type. The platinum electrode is the wire-sealed-in-glass type with a mercury tube for making the contact. The hydrogen electrode is of the Hildebrand type with a platinum electrode partly surrounded by liquid and partly by hydrogen. **The Burettes** have a capacity of 50 ml. and are graduated in 0.1 ml. divisions and fitted with stopcocks. The motor and stirring apparatus are assembled in a unit attached to the rear of the burette support; it is operated directly from a 110-volt circuit. All switches and rheostats are conveniently placed for control from the front of the apparatus. A flexible cord with a plug is provided for attaching directly to the laboratory lighting circuit.

Eppley Electrometric Titration Apparatus as described, with one (1) liter of saturated Potassium Chloride Solution. With motor for 110 volts A. C. **Each, $250.00**

Motor for 110 volts D. C. will be supplied if so ordered.

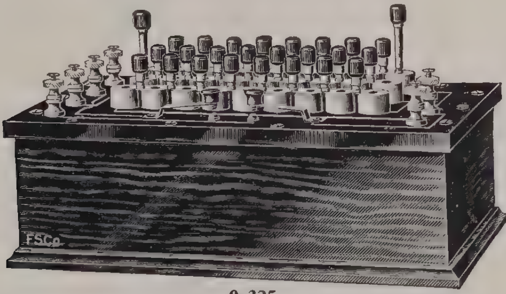
HYDROGEN ION AND CONDUCTIVITY APPARATUS



9-320

9-320. POTENTIOMETER, Hydrogen Ion, Leeds and Northrup. This instrument is recommended for very accurate measurements and can be used for research work requiring the utmost degree of precision. The potentiometer is used with Hydrogen Electrode No. 9-425, Calomel Electrode No. 9-420 and Key No. 9-345, for determining the hydrogen ion concentration of liquids and the potential difference between electrodes in millivolts or in pH units. With the No. 9-420 Saturated Calomel Electrode as the reference electrode, this instrument is used as an ordinary potentiometer. Its range is 1.61 volts with a slide wire range of 110 millivolts, divided into one (1) millivolt divisions. As the graduations are 2 mm. apart, readings of 0.1 millivolt may be obtained.

To use this instrument as a direct reading pH meter, the standard calomel cell is replaced by a tenth-normal calomel electrode. The total range of the instrument is then 14.1 pH units and each division of the main dial represents one (1) pH unit, while the slide wire has a range of 1.1 pH. This instrument has a guaranteed accuracy of 0.01 pH; with the gas chain maintained at 25° C., pH values as close as 0.005 pH can be obtained. Size, 16⅜x8⅛x5⅝ inches. **Each, $180.00**



9-325

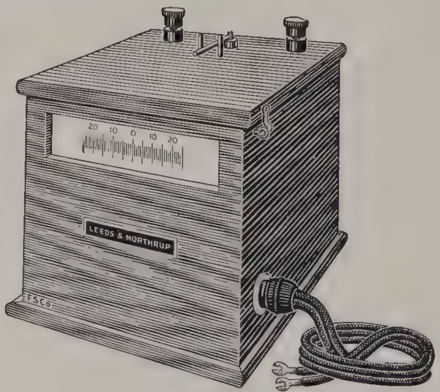
9-325. WHEATSTONE BRIDGE AND RESISTANCE BANK, Combined. This combined bridge and resistance bank is of the "Post Office" type and has sufficient coils and ratio arms to permit of the measuring of any resistance from very small fractions of an ohm to several thousand ohms. It is well constructed and the resistance coils are of an accuracy sufficient for practically all research and industrial work. The coils are made of a special, low temperature coefficient resistance wire, wound non-inductively. All plugs are long, non-corrosive, and carefully fitted to reduce contact resistance. Binding posts are of special design to prevent loss of nuts. Two detachable binding posts are provided for special tests or connections. The variable resistance coils are wound for 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000, 2000, 3000, and 4000 ohms, so that by different combinations any desired resistance from one (1) to 11,110 ohms can be obtained. Each ratio arm has coils of 1, 10, 100 and 1000 ohms resistance. By using the ratio arms along with the resistance coils, resistances of many thousand ohms may be measured. All connections and wires for the circuits to resistances, batteries, galvanometers, etc., are below the top and are indicated by a white line wiring diagram on the top of the box. Size, 14x8x4½ inches. **Each, $75.00**

9-330

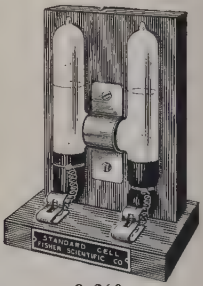
9-330. WHEATSTONE BRIDGE, Improved Slide Wire Type, for use in determining the null point in hydrogen ion and conductivity experiments. This slide wire consists of a platinoid wire stretched over a graduated scale mounted on a heavy board 6½ inches wide and 43½ inches long. A sliding key moves over the wire and establishes contact with a brass strip running parallel to the wire. This eliminates the use of the loose, dangling galvanometer wire and insures a good electrical contact at all times. The slider has two contact points so that the entire length of wire may be used. At the rear of the board is a permanent connector strip with four gaps for inserting additional resistances or interchanging the resistances so as to redistribute the "load" when solutions of widely varying conductivities are to be measured. **Each, $30.00**

9-345

9-350
See also No. 9-355



9-335
See also No. 9-340



9-360
See also No. 9-365 and No. 9-370

9-335. GALVANOMETER, for Direct Current, Leeds and Northrup; with enclosed lamp and scale. For determining the null point or balance in a gas chain when measuring the conductivity of liquids, hydrogen ion concentrations, etc. It is ruggedly built to withstand daily use in the control laboratory. The galvanometer mirror reflects an image of the straight filament of the lamp onto a scale mounted in the front panel of the case. The galvanometer has a sensitivity of 0.025 microampere per millimeter, and has a three second period of vibration. It is wound for use on an open circuit, and has a resistance of 1000 ohms. **Each, $50.00**

9-340. GALVANOMETER, for Alternating Current, Leeds and Northrup; with enclosed lamp and scale. This instrument is similar to the No. 9-335 D.C. Galvanometer, but is designed for use on A.C. only. Its sensitivity is 0.025 microampere per millimeter and has a resistance of 300 ohms. For use on 110-volt, 60-cycle alternating current only. **Each, $110.00**

9-345. CONTACT KEY, Open Circuit Type. For use in conjunction with Wheatstone Bridges No. 9-325 and No. 9-330, or Potentiometer No. 9-320, when making conductivity and hydrogen ion determinations. This key is placed in the main circuit and is used for making and breaking the contact during the determination. It has heavy contact points and is equipped with two binding posts. **Each, $2.25**

9-350. STANDARD CELL, Normal, U. S. Bureau of Standards Certified. This is a primary standard of voltage, adopted by the U. S. Bureau of Standards as the working standard of electromotive force. Cell consists of specially prepared mercury, mercurous sulphate, cadmium sulphate and cadmium amalgam in an H-shaped, sealed glass vessel with sealed-in platinum electrodes, mounted on a hard rubber support suitable for immersion in an oil bath.

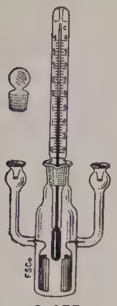
These cells have a very low temperature coefficient (0.00004 volts per °C). Each cell has been certified by the U. S. Bureau of Standards, and the Bureau's Certificate is supplied with it. **Each, $32.00**

9-355. STANDARD CELL, Normal; same as No. 9-350, but without Bureau of Standards certificate. Each cell is supplied with a factory certificate of voltage. **Each, $25.00**

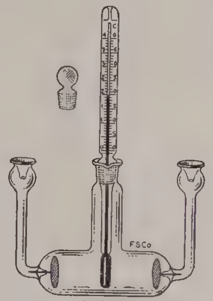
9-360. STUDENT STANDARD CELL. The electrical system of this cell is similar to the Normal Cell, but is not as accurate and is not enclosed. This cell is adapted for students' use, and meets all the requirements of a standard cell accurate to 0.1% at ordinary temperatures. Cell is hermetically sealed in glass to prevent evaporation. The mercurous sulphate is protected from the action of light. Complete cell is mounted on a wooden support. **Each, $10.00**

9-365. STUDENT STANDARD CELL, Unfilled; on Support. This is the glass H-tube with sealed-in platinum electrodes, mounted as shown in illustration No. 9-360, but not filled. This cell can be filled as desired, and it can be used to teach students the technique of preparing standard cells. **Each, $3.25**

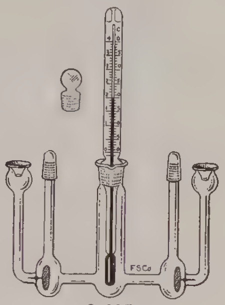
9-370. STUDENT STANDARD CELL, Unfilled; Unmounted. This is the glass cell with electrodes; similar to No. 9-365 but not mounted. **Each, $2.25**



9-375



9-380



9-385

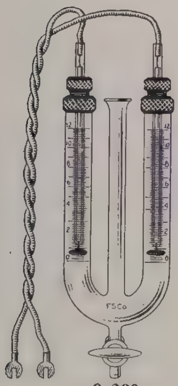
9-375. CONDUCTIVITY CELL, Low Conductivity Type. This cell has been designed for determining the conductivity of commercial plating solutions, electrolytes, acid and alkaline treating baths, etc., in conjunction with Wheatstone Bridge Resistance Box No. 9-325, Galvanometer No. 9-340, and Key No. 9-345. Such an equipment may be operated directly from the 110-volt A.C. line of the laboratory; with Galvanometer No. 9-335, it can be used on direct current.

The cell is filled with the liquid to be tested, used as the fourth arm of the Wheatstone Bridge and its conductivity directly determined. By determining the conductivity of a series of known solutions and plotting a curve, the composition of an unknown solution can be determined by measuring its resistance and referring to this curve. For very precise determinations, the cell can be immersed in a constant temperature water bath.

The cell has a central conductivity chamber into the sides of which are fused platinum electrodes, and in the top of which is a thermometer, graduated from zero to 40° C. in 0.2° divisions and fitted with a ground glass joint. A glass stopper is provided to replace the thermometer when not in use. Contact with the electrodes is established by filling the side tubes with mercury and dipping the connecting wires into this mercury. Volume of cell, 30 ml.; electrode area, 1.0 sq. cm.; cell constant, 0.17 reciprocal cm.; weight of platinum, about 2.5 gms. Supplied with thermometer and platinum electrodes. **Each, $30.00**

9-380. CONDUCTIVITY CELL, Medium Conductivity Type. This cell is similar to the Low Conductivity Type Cell No. 9-375, but has the electrodes farther apart and is used for solutions of greater conductivities than those which can be accommodated in the No. 9-375 Cell. Volume of cell, 35 ml.; electrode area, 2.0 sq. cm.; cell constant, 1.3 reciprocal cm.; weight of platinum, about 2.2 gms. Supplied with thermometer and platinum electrodes. **Each, $26.00**

9-385. CONDUCTIVITY CELL, High Conductivity Type. This cell is similar to the Conductivity Cell No. 9-380, but has its electrodes still farther apart and can be used with solutions of greater conductivity than those accommodated in that cell. Volume of cell, 17 ml.; electrode area, 2.0 sq. cm.; cell constant, 15 reciprocal cm.; weight of platinum, about 2.2 grams. Supplied with thermometer and platinum electrodes. **Each, $33.00**

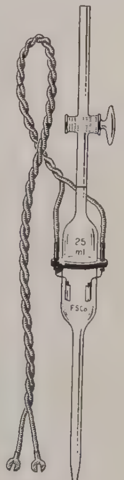


9-390

9-390. CONDUCTIVITY CELL, U-Type. This cell is recommended for student use in conductivity experiments and is used in much the same manner as Conductivity Cells No. 9-375 and No. 9-400. It is accurate and simple enough to enable the student to clearly see the relation between the component parts, and to study the variations in conductivity of a solution with variations in the nature, concentration and temperature of the solution, the distance between the electrodes and the voltage applied to them.

The cell is of the U-tube form and has a filling tube between the two branches of the tube and a draincock at the bottom. This permits the tube to be filled and drained without changing the position of the electrodes. The electrodes are platinum discs fused to wires which are sealed into glass tubes to be filled with mercury for making the electrical contact. The electrodes are adjustable as to distance between them and are held in place by means of a hard rubber plug and lock nut.

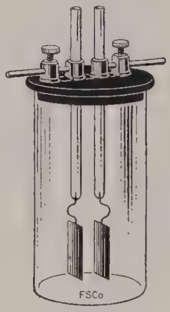
A thermometer can be inserted in the filling tube to indicate the cell temperature. The branches of the cell are graduated from zero to 12 ml. in 0.1 ml. divisions. Approximate weight of platinum, 1.5 gms. Supplied with electrodes, but without thermometer. **Each, $26.00**



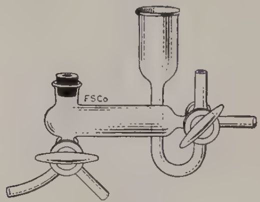
9-395

9-395. CONDUCTIVITY CELL, Pipette Type, for measuring the conductivities of solutions which are decomposed on coming into contact with air. This cell is used in the same manner as Cell No. 9-375. It is very convenient for withdrawing test samples from narrow mouthed bottles, vats, etc., and can be used for measuring the conductivity of liquids and protecting them from air during the measurement. It has a capacity of 25 ml. and is fitted with a stopcock and platinum electrodes; the electrode area is 4.5 sq. cm.; cell constant, 0.3 reciprocal cm. Flexible leads are fastened to the electrodes and are "anchored" by means of a vulcanite collar fitted around the pipette; this protects the terminals. Cell with platinum electrodes. **Each, $24.00**

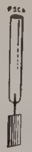
HYDROGEN ION CELLS AND ELECTRODES



9-400



9-405



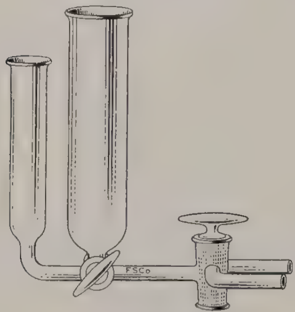
9-410

9-400. CELL, Conductivity, Kohlrausch-Halborn, for determining the conductivity, neutrality, degree of ionization and ionization constant of liquids, according to the method described in Clark's *Determination of Hydrogen Ions*, and Findlay's *Practical Physical Chemistry*. This is an improved form of the Arrhenius and Ostwald Cells, with adjustable electrodes. This cell has two platinum electrodes mounted on glass tubes which are to be filled with mercury for making the contacts. The distance between the electrodes is adjustable so that a wide range of liquids of varying conductivities may be accommodated. Height of cylinder, 95 mm.; diameter of cylinder, 50 mm.; minimum distance between electrodes, 0 mm.; maximum distance between electrodes, 45 mm.; size of electrodes, 15 mm. x 25 mm. **Each, $29.25**

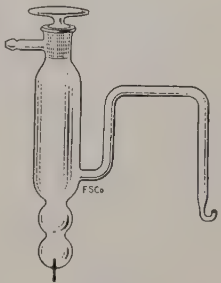
9-405. ELECTRODE VESSEL, Clark, Hydrogen, for the determination of electrode potentials according to Dr. Wm. M. Clark, as described in his book *Determination of Hydrogen Ions*, 182 (1923), also in the *Journal of Biological Chemistry*, XXIII, 475 (1915). This is the double stopcock form to be used with Platinum Electrode No. 9-410. One (or two) of these vessels is used in conjunction with Connecting Vessel No. 9-415 and Calomel Electrode No. 9-420. Length of cell reservoir, 75 mm.; diameter, 15 mm. The electrode is held in this cell by a rubber stopper.

Cell with rubber stopper, without electrode. **Each, $9.00**

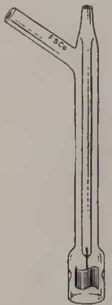
9-410. ELECTRODE, Clark, Hydrogen, for use in Clark Electrode Vessel No. 9-405. Platinum foil electrode 6 x 6 mm. mounted at the end of a glass tube 40 x 6 mm.; electrical contact is made by filling the tube with mercury. **Each, $4.50**



9-415



9-420



9-425

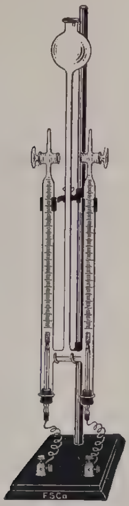
9-415. CONNECTING VESSEL, Clark. Used in conjunction with Electrode Vessel No. 9-405 and Calomel Electrode No. 9-420. For determining electrode potentials by means of the gas chain as described by Clark. This vessel has a central reservoir; an auxiliary reservoir which accommodates the dip-tube of the Calomel Electrode No. 9-420, and a branch which connects to the electrode vessel. Two stopcocks are provided, one at the junction of the main reservoir and the auxiliary reservoir, and a 3-way stopcock which connects the two branches leading to the electrode vessels. This permits two parallel determinations to be made at the same time; one electrode is permitted to reach equilibrium while a determination is being made with the other. **Each, $6.50**

9-420. ELECTRODE, Calomel, Clark. Used in conjunction with Connecting Vessel No. 9-415 and Electrode Vessel No. 9-405. For determining electrode potentials by means of the gas chain, as described by Clark. It can also be used in conjunction with other electrodes for electrolytic titrations. This electrode has a ground glass stopper with opening to the inlet tube. Electrical contact is made through a platinum wire sealed into the bottom of the reservoir. **Each, $4.00**

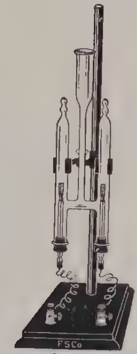
9-425. ELECTRODE, Hydrogen, Hildebrand, for use as a standard gas electrode in conductivity and hydrogen ion determinations in the gas chain where it is used to determine the potential differences by the Poggendorf Compensation Method; (see Clark, *Determination of Hydrogen Ions*, 201, 1923). The platinum electrode is fused into the end of a glass tube to be filled with mercury for the electrical contact. Around this tube is another tube with a side arm near the top, for the introduction of hydrogen, and a perforated bell-shaped enlargement at the bottom. The design of this bell is such that one half of the platinum is in the liquid while the upper half is always surrounded by hydrogen. **Each, $5.00**

ELECTROLYSIS APPARATUS

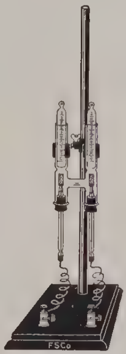
LECTURE TYPE



9-430
See also No. 9-435



9-440
See also No. 9-445



9-450
See also No. 9-455

The three popular types of apparatus have been redesigned to permit the use of different kinds of electrodes in the same apparatus; this new design is more compact and not so easily broken as the old styles. Separate electrodes of the different materials are supplied and they all fit any of three types of Apparatus No. 9-430, No. 9-440 or No. 9-450.

This apparatus can be operated on the usual 110-volt A.C. lighting circuit by using a No. 2-480 Tungar Rectifier to transform the current, and, if desired, a Sliding Resistance No. 9-525 can be used to control the current.

Storage Battery No. 2-470 can also be used to supply the necessary current, or three (3) to six (6) Dry Cells No. 2-425 can be used.

9-430. ELECTROLYSIS APPARATUS, Lecture, Precision Type; new design. The electrolyzer is H-shaped with the reservoir attached to the center; all tubes are in the same plane so that the apparatus requires less space, is less liable to be broken, and is easier to mount on the support on which are the binding posts.

The lower ends of the eudiometer tubes are adapted for interchangeable electrodes so that the platinum electrodes supplied under this number can be readily replaced, or the Carbon or Copper Electrodes No. 9-465 and No. 9-470 can be inserted. This eliminates the weak point in the old styles where the electrodes were sealed through the glass tubes. It also makes the use of this apparatus universal and the same apparatus can be used for demonstrating the electrolytic decomposition of water, hydrochloric acid, nitric acid, ammonia, etc. It can be used for demonstrating the quantitative relation of the gases evolved, or it can be used to show the voltage required by different liquids, to effect electrolytic decomposition.

Each of the eudiometers has a stopcock at the top and is graduated from the stopcock to 60 ml. in 0.2 ml. subdivisions. The glass part is about 630 mm. high over all.

The apparatus is mounted on a cast iron support with a nickel-plated rod; the glass part rests on a support-clamp shaped to take the apparatus, and the tubes are held by an adjustable double-clamp designed for this purpose. Equipped with a pair of platinum electrodes. **Each, $15.00**

9-435. ELECTROLYZER, Glass Part of Apparatus No. 9-430; without electrodes or support. **Each, $ 9.00**

9-440. ELECTROLYSIS APPARATUS, Lecture, Plain Type, new design. The electrolyzer is H-shaped with the reservoir attached to the center. All tubes are in the same plane. The lower ends of the eudiometer tubes are adapted for interchangeable electrodes so that the Carbon or Copper Electrodes No. 9-465 and No. 9-470 can also be used. This design has the advantages mentioned under No. 9-430.

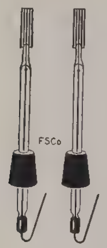
The tubes are ungraduated and the tops are adapted for use with rubber tubing and pinchcocks. The glass part is about 315 mm. high over all. The apparatus is held on the support by an adjustable double-clamp designed for this purpose. Equipped with a pair of platinum electrodes. **Each, $8.50**

9-445. ELECTROLYZER, Glass Part of Apparatus No. 9-440; without electrodes or support. **Each, $2.50**

9-450. ELECTROLYSIS APPARATUS, Lecture, with Sliding Gas-Measuring Tubes, new design. The electrolyzer is H-shaped with the lower ends of the eudiometer tubes adapted for interchangeable electrodes, so that the Carbon or Copper Electrodes No. 9-465 and No. 9-470 can also be used. This design has the advantages mentioned under No. 9-430.

The eudiometers have floating graduated tubes closed at the tops and provided with ring-shaped handles. A constriction in the outer tubes prevents the sliding tubes from extending beyond the connecting tube, and it also serves to direct the gases into the floating tubes. The sliding gas-measuring tubes are graduated from the tops to 10 ml. in 0.2 ml. subdivisions. With the sliding tubes at their lowest point, the length of the glass parts over all is about 150 mm. The support is the same as that used with Apparatus No. 9-440. Equipped with a pair of platinum electrodes. **Each, $9.00**

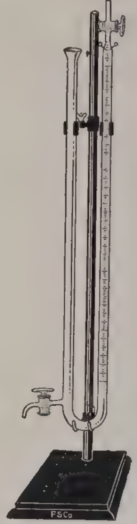
9-455. ELECTROLYZER, Glass Parts of Apparatus No. 9-450; without electrodes or support. **Each, $3.00**



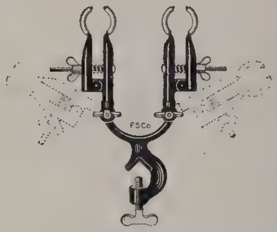
9-460

9-490

9-465
See also No. 9-470



9-475



5-795

9-460. ELECTRODES, Platinum; for use with Electrolysis Apparatus No. 9-430, No. 9-440 and No. 9-450. Each electrode is corrugated platinum foil, 18 x 6 mm., welded to a platinum wire sealed into a glass tube. A copper wire soldered to the platinum wire, passes through the tube and is cemented to the other end. The projecting end of the copper wire serves for making connection with the source of current. These electrodes are supplied with rubber stoppers for holding them in the eudiometer tubes. **Per pair, $2.25**

9-465. ELECTRODES, Carbon; for use with Electrolysis Apparatus No. 9-430, No. 9-440 and No. 9-450. Each electrode is a carbon rod 4.5 mm. diameter and 100 mm. long. A copper wire coil is soldered to one end for connecting the electrode to the source of current. These electrodes are supplied with rubber stoppers for holding them in the eudiometer tubes. They may be used directly, or if desired, they can be plated with a metal to show the effects of the various metals, oxides, etc., on the decomposition voltage. **Per pair, $ .75**

9-470. ELECTRODES, Copper; for use with the Electrolysis Apparatus No. 9-430, No. 9-440 and No. 9-450. Each electrode is similar to the Carbon Electrode No. 9-465, but has a solid copper rod instead of the carbon rod. These electrodes are recommended for general electrolysis work with solutions which do not attack copper, and for electro-plating with copper. **Per pair, $ .75**

9-475. ELECTROLYSIS APPARATUS, Lecture, Hoffman Type, for demonstrating that gases produced by electrolysis will recombine in the same volumetric proportions in which they were produced. The apparatus consists of a 28-inch U-tube eudiometer. One arm has a glass draincock near the bottom, while the other arm has a stopcock at the top and has platinum electrodes sealed in just below the stopcock. This arm is graduated downward from zero to 60 ml. in 0.1 mm. subdivisions. The zero point is a short distance from the stopcock so that a small amount of air may be drawn into the tube before the gas volumes are measured. When a spark is passed between the terminals and the explosion occurs, this air will act as a cushion and prevent the inertia of the column of mercury from breaking the tube.

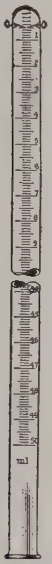
The support is cast iron with a 30-inch nickel-plated rod. The apparatus rests on the prongs of the support-clamp and the arms are held by an adjustable, double-clamp designed for this purpose. **Each, $14.00**

9-480. ELECTROLYZER, Glass Part of Apparatus No. 9-475; without support.................. **Each, $10.00**

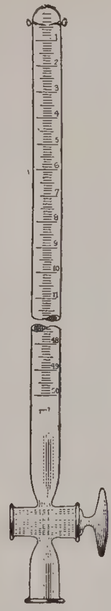
9-485. ELECTROLYSIS APPARATUS SUPPORT, for holding the different Electrolysis Apparatus. This support has a cast-iron base 5 x 8 inches with a nickel-plated supporting rod 20 inches high. There are two binding posts on the base for making connection between the apparatus and the source of current. An adjustable double-clamp (*illustrated and described separately under No. 5-795*) holds the tubes of the apparatus. Clamp Support No. 9-490 is not included with this support, but can be used, if desired, to support the glass parts at the bottom. **Each, $4.00**

9-490. SUPPORT CLAMP. A special clamp used for supporting the bottom of the longer types of Electrolysis Apparatus. It is used with Support No. 9-485 and recommended for holding Electrolysis Apparatus No. 9-430 and No. 9-475. This clamp has a cast-iron clamp holder and heavy wire arms shaped to take the connecting tube of the Electrolysis Apparatus. **Each, $1.25**

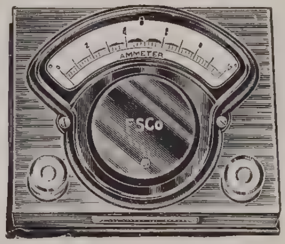
5-795. CLAMP, Double, Adjustable. Designed especially for attaching electrolysis apparatus to support rods. The jaws will hold tubes from $\frac{1}{4}$ inch to $1\frac{3}{4}$ inches diameter, and are rubber covered. The clamps can be spread, as shown in the illustration, to accommodate the different styles of apparatus. **Each, $2.00**



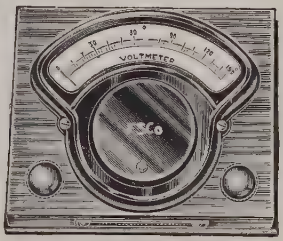
9-495



9-500



9-505
See also No. 9-515



9-510
See also No. 9-520

9-495. ELECTROLYTIC EUDIOMETERS, Bunsen; for demonstrating that the combining ratios of the volumes of gases are simple whole numbers. The eudiometer is filled with mercury, water or other confining liquid in which the gases are insoluble, and inverted into a pneumatic trough. The gas delivery tubes are held under the mouth of the eudiometer and the gases bubbled up through the liquid until the desired volume has been collected. A spark from a small induction coil is then passed between the two platinum electrodes and the mixture exploded. The decrease in volume represents the volume of gas which took part in the reaction. The eudiometers are graduated from the top, and numbered to read down.

Capacity, ml	50	100
Smallest subdivisions, ml	$\frac{1}{10}$	$\frac{1}{5}$
Each	**$3.25**	**3.50**

9-500. ELECTROLYTIC EUDIOMETER, Mitscherlich. This eudiometer is similar to Bunsen Eudiometer No. 9-495, but has a stopcock and flared tube at its lower end. The stopcock is of special construction with a large bore so that the gases may be easily introduced into the eudiometer while the confining liquid is being expelled. The large flared tube prevents the escape of gases while the eudiometer is being charged. Eudiometer is graduated from the top to 50 ml. in $\frac{1}{10}$ ml. subdivisions, numbered to read down. **Each, $4.75**

9-505. AMMETERS, for Direct Current. These meters are portable and are of the d'Arsonval galvanometer type, designed for general laboratory use. The base is of special insulating composition which is unaffected by the ordinary laboratory reagents. The indicating mechanism is enclosed in a dust-and-moisture-proof case. A vane attached to the spindle of the indicator arm, vibrates in an air chamber with a fan-like motion. This dampens the vibration and shortens the time required for the indicator to come to rest. A large scale permits of easy reading. Zero point adjustment can be made without opening the case.

Where desired, these meters can be used with external resistances for extending the range of the particular instrument. Size about 4 x 5 inches. The ranges listed below are those most used in laboratory work; other ranges for special purposes can be supplied upon short notice. These ammeters are for direct current.

Range, amperes	0–10	0–25	0–50
Each	**$15.00**	**17.00**	**20.00**

9-510. VOLTMETERS, for Direct Current. Of similar construction to No. 9-505, with all of the features mentioned under that number, but calibrated to read voltage. For use with direct current only.

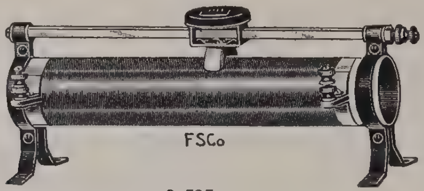
Range, volts	0–10	0–30	0–150
Each	**$15.00**	**15.00**	**18.00**

9-515. AMMETERS, Alternating Current Type. These meters are similar to the No. 9-505 Meters, but are of the electromagnetic repulsion type. Although designed fundamentally for use on A.C., they can be used on D.C. or on A.C. up to 100 cycles frequency. On the D.C., however, they are not as sensitive as the d'Arsonval type Meters No. 9-505.

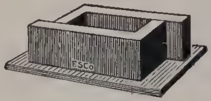
Range, amperes	0–5	0–15	0–50
Each	**$18.00**	**18.00**	**20.00**

9-520. VOLTMETERS, Alternating Current Type. Similar to No. 9-515, but calibrated to read voltage. Can be used on D.C. or on A.C. up to 100 cycles frequency.

Range, volts	0–15	0–30	0–150
Each	**$18.00**	**18.00**	**22.00**



9-525

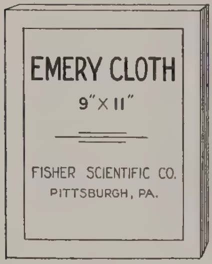


9-530

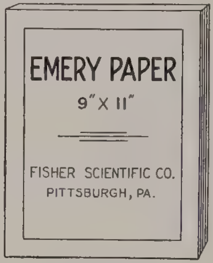
9-525. RHEOSTATS, Sliding Contact. These resistances can be used as rheostats for controlling the current to motors, electrolysis apparatus, etc. They are made of a base-metal, non-corroding, resistance wire wound on an enameled steel tube. A slider moving along a rod above the coil, makes contact with the wire so that any desired amount of resistance may be introduced into the circuit. By using the two binding posts at the ends of the wire, this rheostat can be used as a fixed resistance. A 10% over-load may be applied for a short time without burning out the coil, although such treatment materially shortens the life of the coil. By inserting rubber stoppers into the ends of the core and passing cooling water through it, this resistance can be operated continuously at about 50% over the rated capacity. All capacities indicated are for continuous duty without water cooling; the resistances given are correct to within 5%.

Size	A	B	C	D	E	F	G	H	K	L	M
Resistance, ohms	2870	1435	715	360	175	90	45	22	11	5.6	2.8
Capacity, amperes	.38	.54	.77	1.1	1.5	2.2	3.1	4.4	6.2	8.7	12.3
Each	**$7.50**	**7.50**	**7.50**	**7.50**	**7.50**	**7.50**	**7.50**	**7.75**	**8.00**	**8.50**	**9.00**

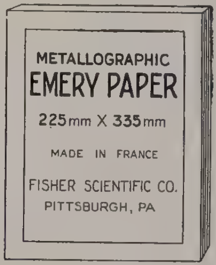
9-530. EMBEDDING BOX, for Paraffine Sections. Consists of two metal L's and a metal plate. The largest enclosure is 24 mm. x 40 mm.; by moving the L's, either one of these dimensions can be reduced to any size desired. The height of the sides is 20 mm. **Each, $1.50**


EMERY CLOTH
9" X 11"
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

9-535


EMERY PAPER
9" X 11"
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

9-540



9-545

9-535. EMERY CLOTH; the ordinary grade; in sheets 9 x 11 inches. Used for removing corrosion and cleaning metals.

Fineness	Fine	Medium	Coarse
Grade No.	00	½	1½
Per dozen sheets	**$1.50**	**1.60**	**1.75**
Per quire (24 sheets)	**$2.70**	**2.85**	**3.15**

9-540. EMERY PAPER; the ordinary grade; in sheets 9 x 11 inches. Used for removing corrosion and cleaning metals.

Fineness	Fine	Medium	Coarse
Grade No.	00	½	1½
Per quire (24 sheets)	**$1.00**	**1.20**	**1.40**
Per pkg. (5 quires), 120 sheets	**$4.50**	**5.40**	**6.25**

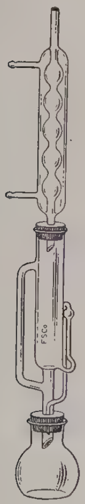
9-545. EMERY PAPER, French, Metallographic; in sheets 225 mm. x 335 mm. This is a special grade of emery paper, made in France and distributed to the Metallographic Laboratories in the United States by ourselves. It is recommended by the A.S.T.M. and in most of the newer books, for the preparation of metal specimens for micro-examination and photography. The material used for each grade of paper is specially prepared for this purpose and is carefully graded for uniformity.

The three finest grades, No. 0000, No. 000 and No. 00, are recommended for the final grinding, before polishing with Fisher Levigated Alumina. The (finest) No. 0000 grade is used for the last grinding of softer metal specimens; the No. 000 grade for specimens of medium hardness; and the No. 00 grade for the final grinding of hard metals. The coarser grades are used for the different stages of preliminary grinding.

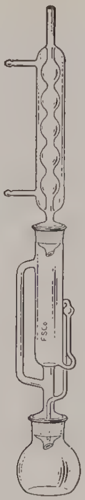
The No. 0000 is the finest grade, and the fineness of the other grades varies in the sequence in which they are listed.

Grade No.	0000	000	00	0	1	1G	2
Per 10 sheets	**$ .65**	**.60**	**.50**	**.50**	**.50**	**.50**	**.50**
Per 100 sheets	**$5.35**	**4.75**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**

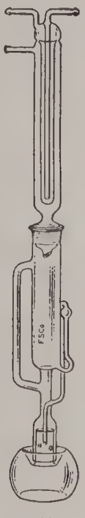
EUDIOMETERS, see No. 9-430 to No. 9-500.



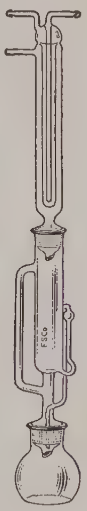
9-550



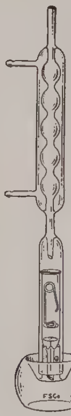
9-555



9-560



9-570



9-575

9-550. EXTRACTION APPARATUS, Soxhlet, complete. Consists of Allihn type condenser, with bulbs; Soxhlet condenser tube; extraction flasks; all fitted together with close-grained corks.

The three sizes described are the new standardized sizes for this style of extractor, adopted by the American Chemical Society. For separate parts, see Extraction Tubes No. 9-635; Condensers No. 7-745 and Flasks No. 9-650. For Extraction Thimbles for use with these Extractors, see No. 9-655.

*Size	A	B	C
Inside diam. of extractor tube, mm.	30	38	50
Height of syphon tube, mm.	70	75	113
Approx. capacity to top of syphon, ml.	50	85	200
Length of body of condenser, mm.	200	225	250
Suitable for use with extraction thimble, mm.	80x25	80x33	123x43
Capacity of flask, ml.	100	150	250
Each	**$4.00**	**4.75**	**5.25**

9-555. EXTRACTION APPARATUS, Soxhlet, with ground joints; with three (3) Extraction Flasks, each one ground to fit. All cork stoppers are eliminated; the three pieces of the apparatus are connected by ground glass joints. This is the standard size with extraction tube, 38 mm. diameter and syphon tube 75 mm. high; suitable for use with Extraction Thimble No. 9-655, size 80 x 33 mm. **Each, $6.75**

9-560. EXTRACTION APPARATUS, Soxhlet-Hopkins, with Knorr, mercury-seal flask. Consists of a Hopkins reflux condenser (operation of which is completely described under No. 7-740); connected by a ground joint to a standard size Soxhlet extraction tube, 38 mm. diameter, with 75 mm. syphon tube; and a Knorr flask, with trough to be filled with mercury, to make an air-tight seal. The flask has two holes in the neck to permit the return of the solvent. Suitable for use with 80 x 33 mm. Extraction Thimble No. 9-655. **Each, $7.50**

9-565. EXTRACTION FLASK, Knorr, with trough for mercury seal; with two holes in the neck; capacity, to shoulder, about 150 ml.; used with Extractor No. 9-560 and Extractor No. 9-575. **Each, $ .85**

9-570. EXTRACTION APPARATUS, Soxhlet-Hopkins, with all ground joints, with three (3) Extraction Flasks. This apparatus is similar to No. 9-560, excepting that it has three usual style extraction flasks, each one of which connects to the extraction tube by means of a ground glass joint. **Each, $8.50**

9-575. EXTRACTION APPARATUS, Walter-Goodrich, an improved form of the Knorr apparatus designed by Walter and Goodrich of the U. S. Bureau of Chemistry; *described in Circular No. 69 of the Bureau.* The features of this apparatus are: the holes in the neck of the flask (above the mercury level) to permit the return of the solvent to the flask; the extraction tube in which the sample is held firmly in place by a perforated disc at the bottom and a perforated disc at the top; the top disc is kept in place by a spring holder, placed on top of the disc. Under this number we supply the glass parts only, consisting of the condenser with extractor-jacket, the extraction tube and the flask. Discs and spring holders should be specified separately under No. 9-576 to No. 9-580. For Extra Extraction Tubes, see No. 9-645; for extra Flasks, see No. 9-565. **Each, $6.00**

9-576. LOWER PERFORATED DISC, Nickel, with pin to prevent it from tipping. For use in Extractor Tube of No. 9-575. **Each, $ .75**

9-577. LOWER PERFORATED DISC, Platinum; similar to No. 9-576. .... **Price upon application**

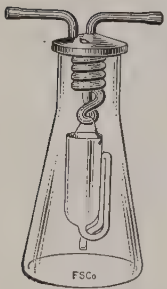
9-578. UPPER PERFORATED DISC, Nickel; for use in Extractor Tube of No. 9-575............. **Each, $ .30**

9-579. UPPER PERFORATED DISC, Platinum; similar to No. 9-578................ **Price upon application**

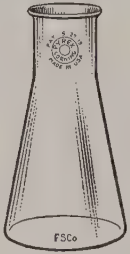
9-580. SPRING HOLDER; to hold the upper disc in Extraction Tube of No. 9-575.................. **Each, $ .50**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

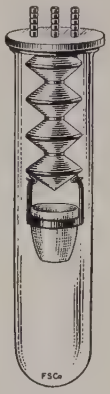
Extraction Apparatus



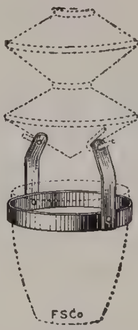
9-585



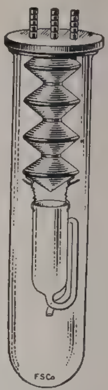
9-600



9-605



8-270



9-620

9-585. EXTRACTION APPARATUS, Rubber. This is the apparatus recommended by the Joint Rubber Insulation Committee; also by the A.S.T.M. for *Method of Analysis of Rubber Products, Serial Designation D 15-24;* also by the U. S. Bureau of Standards in *Letter Circular No. 74*. It is used for the analysis of rubber by the method recommended by the Underwriters' Laboratories.

The extraction syphon-cup and the flask are larger than those in the "Underwriters" model, otherwise the apparatus is the same; the Underwriters having adopted the syphon-cup in place of the filtering crucible.

The cover consists of a block-tin condensing coil with a copper cap which fits over the top of the flask and has a ledge which fits around the rim of the flask and keeps it securely in place. This cover is tinned inside. The extraction syphon-cup is made to the specifications referred to, and the resistance glass flask contains about 400 ml. For use with Extraction Thimbles No. 9-655, size 80 by 22 mm. **Each, $3.50**

9-590. EXTRACTION SYPHON-CUP, for use with Rubber Extractor No. 9-585.................. **Each, $ .90**

9-595. EXTRACTION FLASK, Resistance Glass; capacity 400 ml. for Rubber Extractor No. 9-585. **Each, $ .25**

9-600. EXTRACTION FLASK, Pyrex Glass; capacity, 400 ml. for Rubber Extractor No. 9-585..... **Each, $ .32**

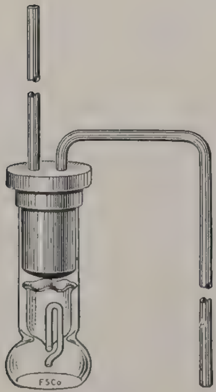
9-605. EXTRACTOR, WILEY, with Fisher Crucible Holder and Porcelain Crucible. With this extractor both the residue and the extracted matter can be conveniently weighed. Consists of a metal Wiley condenser; a Fisher crucible holder; a standard 25 ml. porcelain Gooch filtering crucible, and a glass cylinder 55 mm. diameter and 225 mm. long. The condenser is made of copper, nickel plated on the outside and tinned on the inside; the top of the glass cylinder is ground true so that condenser rests evenly on the rim of this cylinder. The crucible used is the usual 25 ml. porcelain filtering crucible without holes in the sides. This is possible because of the Fisher holder described under No. 8-270. **Each, $7.75**

8-270. EXTRACTION CRUCIBLE HOLDER, Fisher, as used in No. 9-605. Extractor; made of bronze, nickel plated. This holder takes the usual 25 ml. porcelain or alundum filtering crucibles, or others with a 35 mm. top diameter. It eliminates the necessity of special crucibles with holes in the sides; it also eliminates the tedious work of wiring and unwiring the crucible. The supporting clips turn down to allow the crucible to be placed in the holder from the top; the holes in the clips fit on the Wiley condensers. **Each, $ .60**

CRUCIBLES, for use in No. 9-605 Extractor, see No. 8-195, size 25 ml.

9-610. GLASS CYLINDER, for No. 9-605 Extractor.. **Each, $ .90**

9-615. CONDENSER, Wiley, for No. 9-605 Extractor.. **Each, $6.00**



9-630

9-620. EXTRACTOR, Wiley, with Extraction Syphon cup. This apparatus has the same metal condenser and glass cylinder as No. 9-605, but uses a glass syphon-cup instead of a filtering crucible. This permits the use of extraction thimbles 22 mm. diameter, in this type of apparatus. **Each, $7.75**

9-625. EXTRACTION SYPHON-CUP, for use with No. 9-620 Extractor. **Each, $ .90**

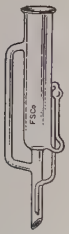
9-630. EXTRACTION APPARATUS, Bailey-Walker. A compact apparatus with a metal condenser which has a large condensing surface and is quite efficient for ether extractions, particularly in warm climates. The glass extraction flask has three indentations which support the glass syphon-cup. The inlet tube is vertical for connection to the water supply and the outlet tube is turned down to drain into a sink or for tubing connection to the waste.

If desired, a No. 8-195, 25 ml. porcelain filtering crucible may be used with this apparatus in place of the syphon-cup. A very convenient battery of seven of these Extractors is illustrated and described under No. 9-665. **Each, $6.75**

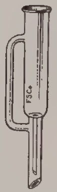
9-631. CONDENSER, Bailey-Walker, for use with Extractor No. 9-630. **Each, $5.00**

9-632. EXTRACTION SYPHON-CUP, for use with Bailey-Walker Extractor No. 9-630. **Each, $ .90**

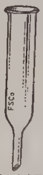
9-633. EXTRACTION FLASK, Bailey-Walker, for use with Extractor No. 9-630. **Each, $ .90**



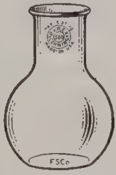
9-635



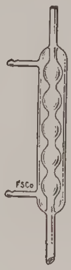
9-640



9-645



9-650



7-745

9-635. EXTRACTION TUBES, Soxhlets; used with Extraction Apparatus No. 9-550.

*Size	A	B	C
Inside diam. of tube, mm	30	38	50
Height of syphon tube, mm	70	75	113
Each	**$1.50**	**2.00**	**2.40**

9-640. EXTRACTION TUBE, Smalley. A simpler form, used by the Southern Cotton Oil Co...... **Each, $1.75**

9-645. EXTRACTION TUBE, Walter-Goodrich. A simple form, in which the sample can be supported as desired, or it can be supported by the perforated discs and holder as described under No. 9-576 to No. 9-580. **Each, $ .70**

9-650. EXTRACTION FLASKS, Pyrex Glass, with wide necks and flat bottom.

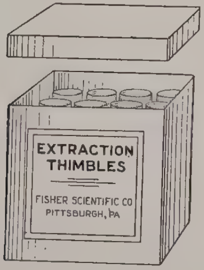
Capacity, ml	100	150	250	500
To take rubber stopper, No	6	7	8	10
Number to the case	120	108	120	60
Each	**$ .18**	**.19**	**.20**	**.29**

In case lots, 10% discount

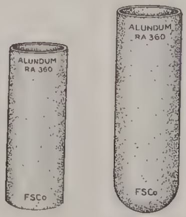
7-745. EXTRACTION CONDENSERS; made of glass, with bulbs to enlarge the condensing surface; condensing tube and jacket sealed.

Length of body, mm	200	225	250
Number of bulbs	5	6	7
Each	**$1.80**	**2.10**	**2.40**

EXTRACTION APPARATUS, Rohrig; for the determination of fat in milk, see Milk Testing Apparatus.



9-655



9-660

9-655. EXTRACTION THIMBLES; made of high-grade fat-free filter paper, of standard thickness (about 1 mm.); made without seams. Ether or similar solvents flow freely through these thimbles while the substance being extracted is retained. Supplied in original boxes only.

*Diameter, mm	19	22	25	33	33	43
Height, mm	90	80	80	80	94	123
Per Box of 25 thimbles	**$2.85**	**2.85**	**3.20**	**3.25**	**3.95**	**6.40**

9-660. EXTRACTION THIMBLES, Alundum; adapted for practically all kinds of extractions, excepting where strong alkalis are involved.

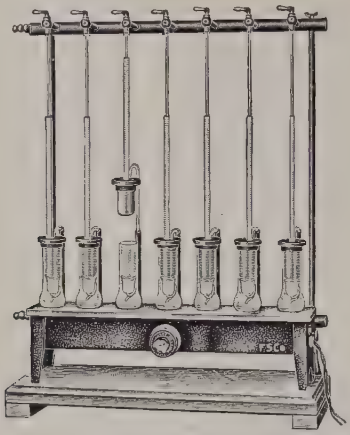
These thimbles can be washed and ignited and used repeatedly; mineral content can be determined by igniting the thimble and weighing; this is quicker than igniting the paper thimble in a weighed crucible.

These thimbles are made of RA 360 Alundum which has a medium degree of porosity and is the grade best adapted to extractions. *Thimbles of fine or coarse porosity for special work, while not carried in stock, can be supplied on short notice.*

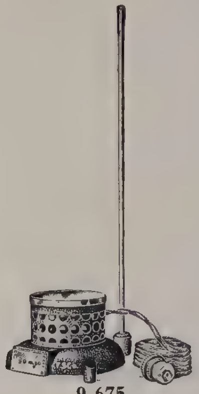
Diameter, mm	19	22	30	34	45
Height, mm	90	80	80	100	127
Shape of bottom	flat	flat	flat	round	round
Each	**$ .50**	**.55**	**.55**	**.65**	**.75**
Per dozen	**$5.28**	**5.94**	**5.94**	**7.26**	**8.58**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

Extraction Apparatus



9-665
See also No. 9-670



9-675

9-665. EXTRACTION APPARATUS, Bailey-Walker, with seven Extractors. A complete outfit with electric heater; support; water supply manifold with seven (7) stopcocks; waste manifold with seven (7) branches; also seven (7) complete Bailey-Walker Extractors No. 9-630.

This is a compact and most convenient apparatus for making extractions where a number are to be made at one time; no plumbing or extra wiring is necessary; simply connect the water and waste manifolds and make one electric connection, and all seven extractors are ready to operate.

With the seven individual stopcocks, the supply to each condenser can be conveniently regulated, or those not required can be shut off when a number of extractions less than seven are being made. A metal tube connected to each stopcock, telescopes inside of the inlet tube of each condenser; the condensers can be raised and the flasks removed without disturbing any connections.

The electric heater is 24 inches long and 4½ inches wide; it draws 600 watts and has three (3) different heats. A single switch connects for low, medium or full heat, as desired, and also shuts off the current.

Apparatus with heater, support, water manifold, waste manifold, seven (7) complete Extractors No. 9-630; equipped with cord and plug. For 110-volt current. **Each, $100.00**

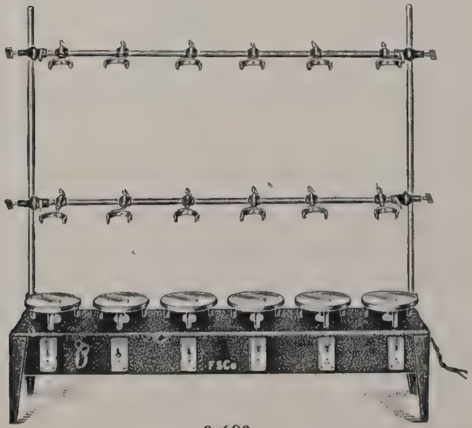
9-670. EXTRACTION HEATER. The heater only, as illustrated and described under No. 9-665. Three heats, for 110 volts. Supplied without the extractor support or extractors, so that it can be set up to heat a battery of any type or size extractors. **Each, $35.00**

9-675. EXTRACTION HEATER AND SUPPORT, Electric. Made with one heavy cast-iron support on which are mounted both the heater and the nickel-plated support rod. The rod 20 inches long.

Extractors of different types can be placed on the heater and held to the support rod by means of the usual style clamps.

The trip switch on the front is mounted in the cast-iron base. The top of the heater is 4 inches diameter, and is wound for 110 volts, 300 watts; supplied with cord and screw plug for attaching to the usual lighting receptacle. (*220-volt heaters are supplied to order.*) Supplied without clamps. **Each, $9.50**

For Extra Heating Units, see No. 11-472, page 405.

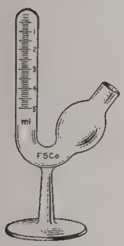


9-680

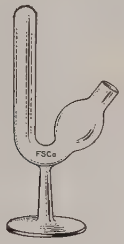
9-680. EXTRACTION HEATER AND SUPPORT. For six Extractors, Electric. There are six (6) separate heaters, each 4 inches diameter, and each heater is equipped with a separate trip switch. The support has six sets of clamps for holding the extractors and these are attached to two rods which can be adjusted to different heights so that different styles of extractors can be held.

The heaters are wound for **110 volts**, 300 watts each; each heater has a separate trip switch. Supplied with a cord and screw-plug for attaching to a main line, but not to a socket on the ordinary lighting wiring. (*220-volt heaters are supplied to order.*) **Each, $85.00**

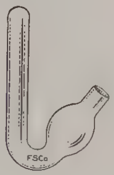
EXTRACTION HEATERS, of other styles, see Heaters, pages 403-406.



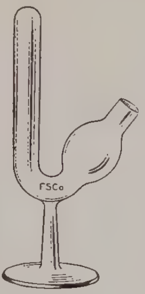
6-605



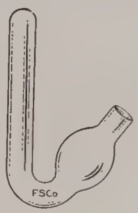
6-610



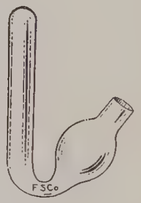
6-615



9-685



9-690



9-695

6-605. FERMENTATION TUBE, Graduated; for the direct reading of the amount of gas generated by fermentation. The vertical tube is 100 mm. high by about 13 mm. outside diameter, and is graduated from 0 to 5 ml. in $\frac{1}{10}$ ml. subdivisions. The capacity of the bulb is larger than that of the evolution tube so that it will not overflow if the contents of this tube is displaced during fermentation. **Each, $1.00**

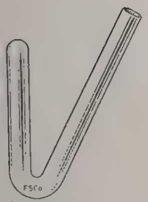
6-610. FERMENTATION TUBE, A.B.S., Small Size. The vertical tube is 100 mm. high and 12 to 13 mm. outside diameter; the diameter of the bulb is about 30 mm.; the tubulature is long to accommodate cotton plugging. This is the smaller size recommended by the American Bacteriological Society. **Each, $ .35** **Dozen lots,** 10% discount

6-615. FERMENTATION TUBE, Without Base, A.B.S., Small Size. The dimensions of this tube are the same as No. 6-610, but it is made without the glass base. **Each, $ .20** **Dozen lots,** 10% discount

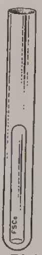
9-685. FERMENTATION TUBE, A.P.H.A. Standard; adopted by the American Public Health Association. This is also the larger size recommended by the American Bacteriological Society. The vertical tube is 140 mm. high by 15 mm. inside diameter; the bulb is 38 mm. diameter; the tubulature is long to accommodate cotton plugging. *Recommended for use in the Examination of Water and Sewage according to the A.P.H.A. Standard Methods, 1917.* **Each, $ .45** **Dozen lots,** 10% discount

9-690. FERMENTATION TUBE, Without Base, A.P.H.A. Standard. The dimensions of this tube are the same as No. 9-685, but it is made without the base. **Each, $ .30** **Dozen lots,** 10% discount

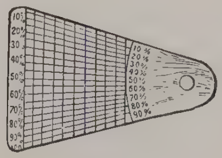
9-695. FERMENTATION TUBE, Constricted, Without Base, Smith modification. The dimensions of this tube are the same as the A.P.H.A. Standard No. 9-685, but the connecting tube is constricted as modified by Dr. Theobald Smith. The outside diameter of the tube between the bulb and the evolution tube is 10 mm. This constricted design effects a better isolation of the two branches. This permits less interchange of fluid, which is desired, because the reactions or hydrogen ion concentrations are different in tube and bulb when bacteria ferment sugars very slowly. If desired, a small amount of mercury can be placed in the connecting tube to further constrict or seal the passage. The tubulature is long to hold cotton plugging. **Each, $ .35** **Dozen lots,** 10% discount



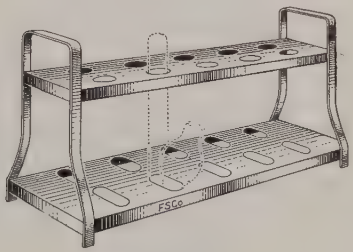
9-700



9-705



9-710



6-620

9-700. FERMENTATION TUBE, Fish Hook Type, A.B.S. Made to the specifications of the American Bacteriological Society for this type of tube. The open end is 120 mm. long and the closed end is 100 mm. long; the outside diameter is 12 to 13 mm. **Each, $ .18** **Dozen lots,** 10% discount

9-705. FERMENTATION TUBE, Dunham. Consists of an outer tube and an inner tube. The outer is a culture tube 150 mm. long by 16 mm. diameter; the inner is a culture tube 75 mm. long by 10 mm. diameter. The material is placed in the smaller tube and this tube is placed in the larger tube in an inverted position. Price includes both tubes. **Per 10, $ .60** **100 lots,** 10% discount

9-710. GASOMETER SCALE, for Fermentation Tubes. Made of wood; graduated from 10% to 100% with diverging per cent lines so that it can be applied to tubes of different heights. **Each, $1.75**

6-620. FERMENTATION TUBE RACK. Made of polished copper for supporting Fermentation Tubes without bases; holds ten (10) tubes. **Each, $2.75**

Files

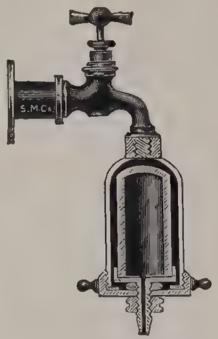
9-715

9-720

9-725

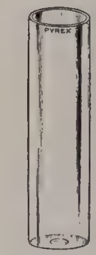
9-730

9-735



9-740

9-745



9-750

9-715. FILE, Flat, bastard cut, not readily clogged. Used for flat surfaces of metals; adapted for shaping the surface of metallurgical specimens. Length of file portion, 6 inches. **Each, $ .30**

9-720. FILES, Round; tapered shape, bastard cut.

Length of cut portion, inches	4	5	6	8
Each	**$ .18**	**.20**	**.22**	**.24**

Dozen lots, 10% discount. **Gross lots,** 20% discount

9-725. FILES, Triangular; slim tapered, side cut. Particularly adapted for cutting glass tubing.

Length of triangular portion, inches	4	5	6	8
Each	**$ .14**	**.16**	**.19**	**.26**

Dozen lots, 10% discount. **Gross lots,** 20% discount

9-730. FILE, Double, Triangular, 8-inch; slim tapered both ways from the center. Two files in one (1) so both ends can be used; its length permits the application of more uniform pressure by using both hands. Length of the file without the wooden handle, 8 inches. Supplied with a detachable wooden handle. **Each, $ .35**

9-735. FILE HANDLE, of wood, with metal ferrule; for use with the different files listed............**Each, $ .10**
Per dozen, $ .90

9-740. FILTER, Berkfeld Water Filter; for attaching to regular ¾-inch hose bibb faucet. Contains an inverted Berkfeld filtering cylinder with metal head. This is held in place by a metal screw cap which is easily removed for cleaning. This filter will retain all foreign matter and has a capacity of one (1) gallon in 6 minutes at 40 pounds pressure. **Each, $8.00**

9-741. FILTER CYLINDER, for replacing the cylinder supplied with Filter No. 9-740; equipped with metal head. **Each, $2.50**

9-743. WRENCH, for removing the metal cap on Filter No. 9-740................................**Each, $1.00**

9-745. FILTER CYLINDERS, Berkfeld. The standard laboratory filtering cylinders for retaining bacteria; used by the New York Health Department for filtering toxin for antitoxin. They yield a clear and sterile blood serum, also a clear and colorless milk serum free from fat.

They are supplied under this number in the Normal (or medium) porosity, marked "N"; this is the grade most used. They can also be supplied to order, Very Porous ("V") or Very Dense ("W"). If desired in either of the special porosities, it should be clearly specified.

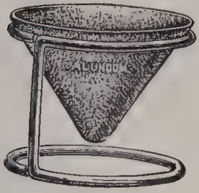
Each cylinder has a metal headpiece attached and is supplied with washers and lock-nut for attaching it to Glass Mantels No. 9-750, without leaks.

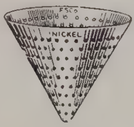
Size	A	B	C	D
Length of cylinder, inches	10	8	5	2½
Diameter of cylinder, inches	2	1	1	⅝
Each	**$4.60**	**3.45**	**2.90**	**1.45**

9-750. FILTER MANTELS, Pyrex Glass. Used with No. 9-745 Cylinders as the containers for the fluids to be filtered. The hole in the bottom is the proper diameter to allow the stem of the cylinder to be inserted; it is then made tight by the washers and lock-nut supplied with the cylinder. The stem is then inserted in the top of a Filter Flask and the vacuum applied by a mechanical pump or a water-operated Filter Pump.

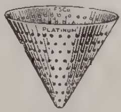
Pyrex glass is stronger, more resistant to chemical action and better withstands sterilization. Each size takes the cylinder designated by the corresponding letter.

Size	A	B	C	D
Height, inches	13	11	5⅝	4¼
Outside diameter, inches	4⅜	2¾	2¾	1¼
Diameter of opening, inch	¾	9/16	⅝	⅜
Each	**$1.40**	**1.10**	**1.00**	**.60**

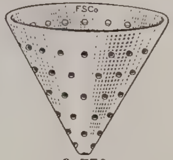

9-755



9-760



9-765



9-770

9-755. FILTER CONES, Alundum. Made to a 60° angle to fit in usual funnel. A rubber band placed around the cone, as close to the top as possible, makes a tight joint with a glass funnel, and it can be used with suction with the entire surface of the alundum cone available for filtering. These cones can be used for invert sugar, organic, inorganic and a large variety of filtration, excepting where strong alkalis are involved.

A light aluminum stand is supplied with each cone. This is convenient as a holder for the cone when not in use, and as a stand for it when being weighed.

These cones have a medium porosity adapted for general filtrations, known as RA 321. Cones for special work of finer or coarse composition, can be supplied to order.

Capacity, ml	20	50	250
Diameter, mm	45	65	110
Each	**$ .40**	**.50**	**1.25**

9-760. FILTER CONE, Nickel. A thin but strong, profusely perforated cone made of pure nickel, in one piece without a seam. Less expensive than platinum and very useful to hold filter paper in a funnel when suction is applied. The cone is 38 mm. diameter, and the sides have a 60° angle to fit the standard filtering funnel.
Each, $3.50

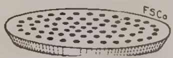
9-765. FILTER CONES, Platinum. Made in one piece, profusely perforated; angle 60°. Sold per gram at a price which includes the cost of manufacture of the cone; this price fluctuates with the platinum market.

Diameter, mm	19	22	25	30
Approximate weight, grams	1	1.5	2.1	3.1

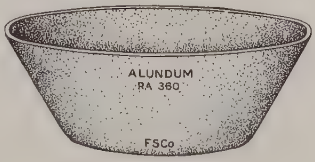
Price upon application

9-770. FILTER CONE, Porcelain; glazed inside and outside, except the rim; perforated. Diameter of cone, 50 mm.; angle 60°.
Each, $ .65

9-775



9-780



9-785

FILTER CARTRIDGES, see Extraction Thimbles No. 9-655 and No. 9-660.

FILTER CRUCIBLES, see Crucibles No. 8-195 to No. 8-255.

9-775. FILTER DISCS, Alundum. Used in funnels for a large variety of filtrations, excepting those where strong alkalis are involved. They can be substituted for an asbestos mat; are easily cleaned by reverse washing and can be ignited. The edges are beveled at an angle of 60° to fit the usual funnel, and they can be packed tight with asbestos or they can be permanently cemented in the funnel. They have a medium porosity, known as RA 225. (*Larger sizes can be supplied to order.*)

Diameter, mm	19	25	50
Thickness, mm	2	2	3
Each	**$ .40**	**.40**	**.40**

9-780. FILTER DISCS, Porcelain, Perforated; top surface glazed. Used in open-bottom crucibles, glass holders or in the ordinary 60° funnels for supporting the filtering mass. The edges are beveled at an angle of 60° to fit the sides of the funnel.

Diameter, mm	22	25	38	50
Each	**$ .15**	**.15**	**.25**	**.30**

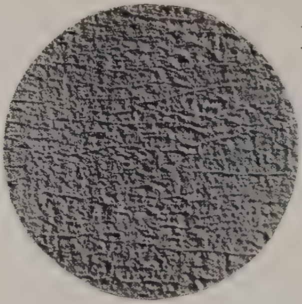
9-785. FILTER DISHES, Alundum RA-360. Adapted for more rapid filtering of larger quantities and for retaining larger amounts of residue such as are often encountered in organic analyses. They can be used with suction by inserting in a large funnel in a manner suggested under No. 9-755. These dishes are also useful for drying and ignition of precipitates, but the dish should not be exposed to the open flame.

Capacity, ml	300	400
Diameter, mm	100	140
Each	**$ 1.25**	**1.75**
Per dozen	**$13.20**	**19.80**

FILTER PAPERS

MADE FROM PURE SWEDISH RAW MATERIAL
MEDIUM TEXTURE - SPEED - RETENTIVENESS
SCIMATCO
ANALYTICAL
FILTER PAPER
Chemically pure, free from chlorine and acids
Diameter 9 Cm
Ash of each paper 0.0005 gr
FISHER SCIENTIFIC CO., PITTSBURGH, PA.

9-790



Photograph (without magnification) of the semi-crimped surface of No. 9-795 Fisher Filter Paper

9-795
See also No. 9-800

REGARDING FILTER PAPERS

No one filter paper is best suited for all filtrations. Each paper has characteristics which make it suitable for certain kinds of filtrations, but not for others.

This catalogue, we believe, will simplify the problem of selecting a paper to suit the requirements of any particular filtration.

With each filter paper we have given an original description, in which we have described its characteristics, such as texture, retentiveness, speed of filtration, etc., and have stated the kinds of filtrations for which it is best suited. Where the same make of paper is listed in different textures, we have given a quick reference to the outstanding characteristics of each of these papers.

The one hundred and twenty (120) different filter papers listed have been selected from all those available; this large assortment offers a wide choice from which to select a particular make with the proper treatment, characteristics and size to meet the requirements of the particular filtration for which it is desired.

We carry them all in stock, and part of our service is to send samples for trial.

9-790. **FILTER PAPER, Scimatco, Analytical, Medium Texture.** An inexpensive analytical paper, used by some of the largest Industrial Laboratories. Made of pure Swedish raw material; has a **medium texture** which makes it **fairly retentive** and **fairly rapid.**

Practical analyses made by Dr. K. K. Stevens, Director of Industrial Chemistry, Carnegie Institute of Technology, showed these papers to be suited for many filtrations for which papers costing considerably more, were often employed.

Such filtrations are those required in the determinations of Graphitic Carbon, Silica, Ammonium Phospho-Molybdate, Barium Sulphate, Iron Hydroxide, Aluminum Hydroxide, Calcium Oxalate, and Insoluble Residues, as occurring in the analyses of Iron and Steel, Iron Ore, Limestone, Coal and Coke Analyses, and in general quantitative work where a paper having a medium speed, medium texture, and medium retentivity, is required.

However, as this paper is not a double washed paper, it is not recommended for research work, or determinations requiring practical absence of ash. The ash of this paper is 0.0008 grams for an 11 cm. paper. This paper will be found to meet ordinary conditions in quantitative work where the weight of the ash is taken into consideration in the final weight, or where the quantity of material finally weighed is large enough to permit of neglecting the weight of the ash. This paper should be used in conjunction with a filter cone if vacuum filtration is required.

Diameter, cm.	9	11	12½	15
Per pkg. (100 sheets)	$ .65	.75	.95	1.10

Lots of 100 pkgs., 10% discount

9-795. **FILTER PAPER, Fisher, Qualitative, Semi-crimped, Very Rapid.** This paper is adapted to about 95% of all the students' work, and for clearing solutions. It is white, has a soft texture, is remarkably free from "pin holes," and the surface of the paper is semi-crimped which increases its filtering speed without destroying its uniformity. (*See illustration from unretouched photo at top of this page.*) The combination of its soft texture and the semi-crimped surface makes it a most rapid filtering paper. It is the least expensive paper of this quality, and many Universities have adopted it for all qualitative filtrations.

On account of the rapid filtering qualities of this paper, it is not adapted for retaining the very finest precipitates; for such paper see No. 9-805.

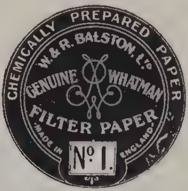
Diameter, cm.	7½	9	11	12½	15
Per pkg. (100 sheets)	$ .15	.20	.25	.30	.45

Diameter, cm.	20	25	33	38	45
Per pkg. (100 sheets)	$ .65	.80	1.15	1.55	1.80

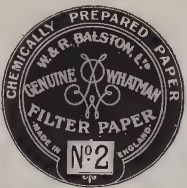
One dozen pkgs., 10% discount **One hundred pkgs.,** 15% discount

9-800. **FILTER PAPER, Fisher, Qualitative, Large Sheets.** The same semi-crimped, rapid filtering paper as No. 9-795, but cut in large sheets, 480 x 480 cm. (19 x 19 inches).

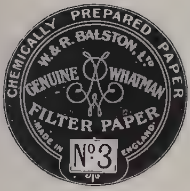
Per quire (24 sheets) $ .80
Per ream (500 sheets) **$11.00**



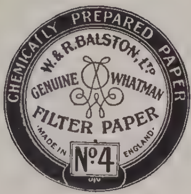
9-805



9-810
See also No. 9-815



9-820



9-825

9-830

REGARDING WHATMAN FILTER PAPERS

Whatman paper is made by the famous paper factory, Springfield Mill, Maidstone, England, and is offered in many grades, and of different textures. We have listed and described them in a way that will enable the chemist to quickly ascertain the paper best suited to any particular filtrations.

Our stock of these papers is obtained from the English factory, and we keep all the papers on hand for prompt delivery.

We are Distributing Agents for Whatman Papers, and supply them at the prices given, with the following discounts:

5% discount on an order of $100.00 list value
10% discount on an order of $200.00 list value
15% discount on an order of $500.00 list value

WHATMAN UNWASHED PAPERS

The following is a quick reference to the characteristics of Whatman unwashed filter papers:

MEDIUM, medium speed and retentiveness	**No. 9-810,** Whatman No. 2
DENSE, more retentive, less rapid	**No. 9-805,** Whatman No. 1
THICK, stronger, quite retentive	**No. 9-820,** Whatman No. 3
SOFT, more rapid, less retentive	**No. 9-825,** Whatman No. 4
VERY DENSE, very retentive, filters slowly	**No. 9-830,** Whatman No. 5

9-805. FILTER PAPER, Whatman No. 1, Unwashed, Dense. This is the least expensive Whatman paper. It is more dense in texture than No. 9-810, which enables it to hold finer precipitates, but it will not filter as rapidly.

Diameter, cm.	7	9	11	12½	15	18½	24
Per pkg. (100 sheets)	$ .18	.22	.25	.33	.46	.64	1.15

9-810. FILTER PAPER, Whatman No. 2, Unwashed, Medium. This is the most used grade of unwashed Whatman paper, and is adapted to general laboratory purposes. The paper is stout, with a medium texture so that it is fairly rapid and retentive.

Diameter, cm.	7	9	11	12½	15	18½	24
Per pkg. (100 sheets)	$ .24	.31	.38	.47	.67	.94	1.60

9-815. FILTER PAPER, Whatman No. 2, Large Sheets. The same medium texture as No. 9-810, but it is cut in large sheets, 23 x 23 inches.

Per 100 sheets, $ 7.95
Per ream (500 sheets), **$36.00**

9-820. FILTER PAPER, Whatman No. 3, Unwashed, Thick. This is a special paper, being extra heavy and very strong. It is adapted to filtrations with suction, is quite retentive and will withstand an unusual amount of washing.

Diameter, cm.	9	11	12½	15
Per pkg. (100 sheets)	$ .45	.51	.67	.95

9-825. FILTER PAPER, Whatman No. 4, Unwashed, Soft. This paper has a soft texture and is the most rapid, unwashed Whatman paper. It should be confined to filtrations where the precipitates are coarse or gelatinous. It is quite popular for routine filtrations where time is an important factor.

Diameter, cm.	9	11	12½	15
Per pkg. (100 sheets)	$ .36	.45	.59	.80

9-830. FILTER PAPER, Whatman No. 5, Unwashed, Retentive. This is a special paper of very dense texture which makes it filter slowly. It should be confined to filtrations where very fine precipitates are to be held.

Diameter, cm.	9	11	12½	15
Per pkg. (100 sheets)	$ .31	.37	.50	.70

WHATMAN SINGLE-WASHED PAPERS

9-835

9-840

9-835. FILTER PAPER, Whatman No. 30, Single-Washed, Medium. This paper has been washed in hydrochloric acid which reduces the amount of ash, after incineration. The ash is not as low as that of the double-washed papers, but it is less expensive and serves for many analyses.

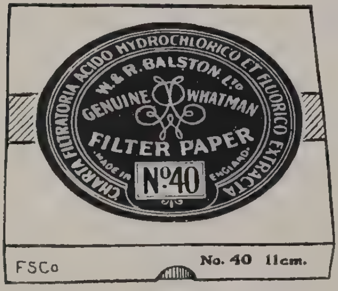
This grade has a medium texture so that it is fairly rapid and retentive. It is the most popular single-washed Whatman paper, and is best suited to most filtrations.

Diameter, cm	9	11	12½
Per pkg. (100 sheets)	$ .75	.95	1.20

9-840. FILTER PAPER, Whatman No. 31, Single-Washed, Soft. This paper has been washed in hydrochloric acid like the No. 9-835, but it has a more open texture which makes it filter more rapidly. The use of this paper should be confined to coarse and gelatinous precipitates.

Diameter, cm	9	11
Per pkg. (100 sheets)	$ .75	.95

WHATMAN DOUBLE-WASHED FILTER PAPERS



9-845

REGARDING WHATMAN DOUBLE-WASHED PAPERS

The Whatman Double-Washed Papers are washed in hydrochloric acid and hydrofluoric acid, and have the ash, after incineration, reduced to the minimum. The double-washed grade of Whatman paper should be used for precise analytical work.

The ash, in grams per circle, for papers No. 9-845, No. 9-850, and No. 9-855, is as follows:

Diameter, cm	7	9	11	12½	15
Ash, grams	.000046	.000076	.00011	.00015	.00021

Each pkg. of 100 sheets is supplied in a sealed pasteboard box.

There are **four different Whatman Double-Washed Papers**; the following is a quick reference to the characteristics of these four papers.

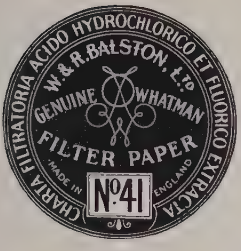
MEDIUM, medium speed and retentiveness	**No. 9-845,** Whatman No. 40
SOFT, more rapid, less retentive	**No. 9-850,** Whatman No. 41
DENSE, more retentive, less rapid	**No. 9-855,** Whatman No. 42
THIN, very low ash, medium texture	**No. 9-860,** Whatman No. 44

9-845. FILTER PAPER, Whatman No. 40, Double-Washed, Medium. This paper has been washed in hydrochloric acid and hydrofluoric acid. It has a medium texture so that it is fairly rapid and retentive. It is the most used Whatman double-washed paper, and is adapted to most filtrations.

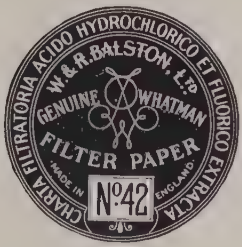
Diameter, cm	7	9	11	12½	15
Per pkg. (100 sheets)	$ .95	1.35	1.60	1.85	2.15

WHATMAN DOUBLE-WASHED PAPERS

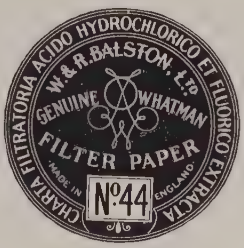
(*continued*)



9-850



9-855



9-860

9-850. FILTER PAPER, Whatman No. 41, Double-Washed, Soft. This paper has been washed in hydrochloric acid and hydrofluoric acid. It has a soft texture which makes it filter very rapidly, but it is not so retentive. Its use should be confined to coarse and gelatinous precipitates. It is used quite extensively for routine analyses where time is an important factor.

Diameter, cm	7	9	11	12½	15
Per pkg. (100 sheets)	$ .95	1.35	1.60	1.85	2.15

9-855. FILTER PAPER, Whatman No. 42, Double-Washed, Dense. This paper is washed in hydrochloric acid and hydrofluoric acid. It has a dense texture which makes it filter slowly, but enables it to hold very fine precipitates. The use of this paper should be confined to filtrations where the No. 9-845 Paper is not sufficiently retentive.

Diameter, cm	7	9	11	12½	15
Per pkg. (100 sheets)	$ .95	1.35	1.60	1.85	2.15

9-860. FILTER PAPER, Whatman No. 44, Double-Washed, Thin. This paper has been washed in hydrochloric acid and hydrofluoric acid. It has the lowest amount of ash of any Whatman paper, and is therefore adapted to precise analyses. *The ash for this paper, in grams per circle, is:*

Diameter, cm	7	9	11	12½	15
Ash, grams	.000025	.000042	.000062	.00008	.00018

This paper has a medium texture, and being thin, it filters more rapidly than No. 9-845, but is not so retentive.

Diameter, cm	7	9	11	12½	15
Per pkg. (100 sheets)	$1.20	1.75	2.05	2.25	2.90

9-865

9-870

9-865. FILTER PAPER, Whatman No. 50, Hardened. This is a special paper that has been hardened by treatment with nitric acid. Its use is confined to filtrations where an exceedingly strong paper is required to resist pressure, also to retain the very fine precipitates. The surface of this paper is so hard and smooth that it can be scraped and washed and the same paper used again.

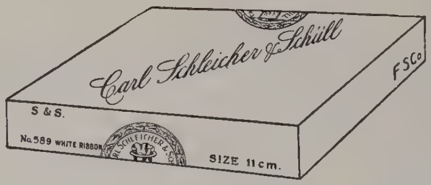
Diameter, cm	9	11	12½	15
Per pkg. (100 sheets)	$1.55	1.80	2.10	2.45

9-870. FILTER PAPER, Whatman No. 100, Fat Free Strips, for Milk Analysis. This paper is remarkably pure and of great absorptive power, as required for the accurate determination of fat in milk by the Adams method. The strips are 58 cm. long and 6.25 cm. wide and are put up in packages of 50 and 100 pieces.

Per pkg. (50 strips) **$2.50**
Per large pkg. (100 strips) **$4.70**

CHARTA FILTRATORIA ACIDO HYDROCHLORICO ET FLUORICO EXTRACTA
C. SCHLEICHER & SCHÜLL
№ 589
R.F.P.
11 cm

9-875 **9-880** **9-885**



9-875
See also No. 9-880 and 9-885

SCHLEICHER AND SCHÜLL (S.&S.) FILTER PAPERS

REGARDING S.&S. FILTER PAPERS

This is the original S.&S. filter paper, made in the Rheinland, which we listed in our older catalogues, but discontinued during the years 1915 to 1920.

Some of the Industrial Laboratories prefer this make, and in order to take care of this demand we have again added the following popular grades and sizes to our regular stock.

We are Distributing Agents for S.&S. Papers, and supply them from our stock at the prices given, with the following discounts:

5% discount on an order of $100.00 list value
10% discount on an order of $200.00 list value
15% discount on an order of $500.00 list value

S.&S. Filter Papers are supplied in packages of 100 sheets; each package, of sizes 18½ cm. and smaller, is supplied in a sealed pasteboard box.

The following is a quick reference to the characteristics of S. & S. Filter Papers.

MEDIUM, Double-Washed, medium speed and retentiveness	**No. 9-875,**	S.&S. 589 White Band
SOFT, Double-Washed, rapid, less retentive	**No. 9-880,**	S.&S. 589 Black Band
DENSE, Double-Washed, more retentive, less rapid	**No. 9-885,**	S.&S. 589 Blue Band
MEDIUM, Unwashed, medium speed and retentiveness	**No. 9-890,**	S.&S. 597
THIN, Unwashed, thin, less retentive, fairly rapid	**No. 9-895,**	S.&S. 595
FOLDED, Unwashed, for rapid filtration of solutions	**No. 9-900,**	S.&S. 588

S.&S. DOUBLE-WASHED FILTER PAPERS

All of the S.&S. Double-Washed Filter papers have been washed in hydrochloric acid and hydrofluoric acid, and have the ash, after incineration, reduced to a minimum. *The ash, in grams, per circle, for S.&S. papers No. 9-875, No. 9-880 and No. 9-885, is as follows:*

Diameter, cm	9	11	12½	15
Ash, grams	.00011	.00017	.00021	.00025

This is the grade of S.&S. paper that should be used for precise analytical work.

9-875. FILTER PAPER, S.&S. No. 589, White Band, Double-Washed, Medium. This paper has a medium texture, and, therefore, is fairly rapid and retentive. It is the grade most used, as it is adapted to general laboratory filtrations. This grade is supplied when a double-washed paper is specified without designating the texture.

Diameter, cm	9	11	12½	15
Per pkg. (100 sheets)	**$1.25**	**1.60**	**1.85**	**2.15**

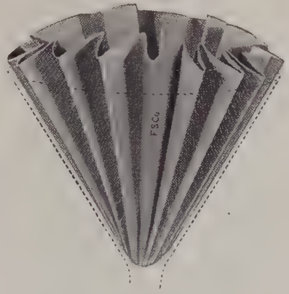
9-880. FILTER PAPER, S.&S. No. 589, Black Band, Double-Washed, Soft. This paper has a soft, loose texture which makes it filter very rapidly, and for this reason it is popular for routine analyses where time is an important factor. Its use should be confined to filtrations, where the precipitates are fairly coarse or gelatinous, as it is not as retentive as the No. 9-875 or No. 9-885.

Diameter, cm	9	11	12½	15
Per pkg. (100 sheets)	**$1.25**	**1.60**	**1.85**	**2.15**

9-885. FILTER PAPER, S.&S. No. 589, Blue Band, Double-Washed, Dense. This paper has a close, dense texture which makes it very retentive, but not so rapid. Its use should be confined to filtrations where the precipitates are very fine, and are not retained by Paper No. 9-875. The filtering speed of this paper is disappointing if used for ordinary filtrations.

Diameter, cm	9	11
Per pkg. (100 sheets)	**$1.25**	**1.60**

9-890
See also No. 9-895



9-900

9-905

9-890. FILTER PAPER, S.&S. No. 597, Unwashed, Medium. A pure unwashed paper with a strong, medium texture. It is the most used unwashed S.&S. paper, and is adapted to most filtrations. This paper filters rapidly and holds all precipitates except the very fine ones.

Diameter, cm	9	11	12½	15
Per pkg. (100 sheets)	**$ .30**	**.38**	**.47**	**.67**

9-895. FILTER PAPER, S.&S. No. 595, Unwashed, Thin. This paper is not as thick, and, therefore, filters more rapidly but is less retentive. It is recommended for more rapid filtration.

Diameter, cm	9	11	12½	15
Per pkg. (100 sheets)	**$ .20**	**.25**	**.33**	**.41**

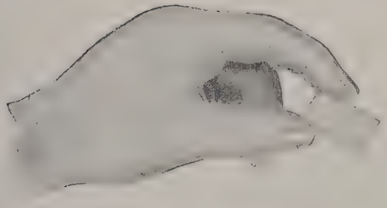
9-900. FILTER PAPER, S.&S. No. 588, Folded. This paper has a strong texture, is handmade and is folded in an unusual way which prevents tearing at the point. The folds of the paper increase the filtering surface, and hold the paper away from the sides of the funnel, thereby enabling it to filter very rapidly.

It is used extensively for clearing solutions, in Pharmaceutical work, for filtering extracts and oils, and for filtrations where a large quantity of liquid is to be put through a paper in a short time.

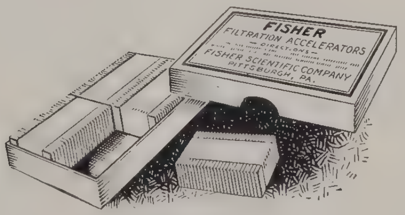
Diameter, cm	12½	15	18½	24	32	38½
Per box (100 sheets)	**$ .60**	**.75**	**1.00**	**1.50**	**2.45**	**3.00**

9-905. FILTER PAPER, Chardin, for Agar Agar. This is a folded paper especially prepared for filtering agar for culture media. The 32 cm. size is packed 50 folded sheets to the box. The 50 cm. size is packed 25 folded sheets to the box.

Diameter, cm	32	50
Number to box	50	25
Per box	**$2.00**	**2.00**



Showing the small size of Accelerator
9-906



The Package of 100 Accelerators
9-906

9-906. FILTRATION ACCELERATORS, Fisher. One of these accelerators added to the solution before it is passed through a filter paper, will speed up the filtration and increase the amount of precipitate retained. The accelerator is made of pure paper fibre and weighs about 0.27 grams. The average weight of ash is .00018 grams. In the usual analysis, one accelerator is sufficient and one passage of the solution is sufficient when an accelerator is used.

Per box of 100 Accelerators, **$1.10**

MUNKTELL SWEDISH FILTER PAPERS

J.H.MUNKTELL'S UNRIVALLED GENUINE SWEDISH FILTERING PAPER
RECOMMENDED BY THE MOST CLEVER CHEMISTS
BERZELIUS CONSIDERED IT THE BEST IN THE WORLD
No 00
11 Cm
EACH PACKET CONTAINING 100 FILTERS
THE ASHES OF EACH FILTER 0,000045 GR
TREATED WITH HYDROCHLORIC AND HYDROFLUORIC ACID

9-910

J.H.MUNKTELL'S UNRIVALLED GENUINE SWEDISH FILTERING PAPER
RECOMMENDED BY THE MOST CLEVER CHEMISTS
BERZELIUS CONSIDERED IT THE BEST IN THE WORLD
No 0
11 Cm
EACH PACKET CONTAINING 100 FILTERS
THE ASHES OF EACH FILTER 0,00025 GR.
EXTRACTED BY HYDROCHLORIC ACID

9-915

J.H.MUNKTELL'S UNRIVALLED GENUINE SWEDISH FILTERING PAPER
RECOMMENDED BY THE MOST CLEVER CHEMISTS
BERZELIUS CONSIDERED IT THE BEST IN THE WORLD
No 0B
11 Cm
EACH PACKET CONTAINING 100 FILTERS
THE ASHES OF EACH FILTER 0,00033 GR
EXTRACTED BY HYDROCHLORIC ACID

9-920

REGARDING MUNKTELL FILTER PAPERS

The Munktell Filter Paper is made in Sweden where, it is claimed, the raw material available, the pure water supply and the climatic conditions are especially adapted to the manufacture of high-grade Filter Paper.

We carry in stock all of the Munktell Filter Papers described in this catalogue, and supply them along with other laboratory requirements at the standard factory prices listed, with the following discount:

5% discount on an order of $100.00 list value

Munktell Papers are packed at the factory in birch bark boxes; there are 5 packages of 100 sheets each in a box.

The following is a quick reference to the characteristics of Munktell Filter Papers:

MEDIUM, Double-Washed, low ash, fairly rapid and retentive	**No. 9-910,**	Munk. No. 00
MEDIUM, Single-Washed, fairly rapid and retentive	**No. 9-915,**	Munk. No. 0
SOFT, Single-Washed, rapid, less retentive	**No. 9-920,**	Munk. No. 0B
MEDIUM, Unwashed, fairly rapid and retentive	**No. 9-925,**	Munk. No. 1F
SOFT, Unwashed, more rapid, less retentive	**No. 9-935,**	Munk. No. 2
HEAVY, Unwashed, stronger, fairly rapid	**No. 9-940,**	Munk. No. 3

9-910. FILTER PAPER, Munktell No. 00, Double-Washed, Medium. This paper has been washed in hydrochloric acid and hydrofluoric acid, which reduces the ash, after incineration, to the minimum. *The ash for this paper is very low, and in grams per circle, is:*

Diameter, cm	9	11
Ash, grams	.000030	.000045

This grade is recommended for precise analytical work; it has a medium texture, is fairly rapid and fairly retentive, and is suited to most filtrations.

Diameter, cm	9	11
Per pkg. (100 sheets)	**$1.68**	**2.03**

9-915. FILTER PAPER, Munktell No. 0, Single-Washed, Medium. This paper has been washed in hydrochloric acid removing traces of iron, alumina, lime, etc. The ash is lower than the unwashed papers, but not as low as the double-washed papers. It has a medium texture which makes it suitable for general laboratory work, it being fairly rapid and fairly retentive.

Diameter, cm	9	11	12½
Per pkg. (100 sheets)	**$ .87**	**1.12**	**1.33**

9-920. FILTER PAPER, Munktell No. 0B, Single-Washed, Soft. Like the No. 9-915, this paper has been washed in hydrochloric acid but it has a softer texture which makes it filter more rapidly. It is thicker than No. 9-915 so that, although of soft texture, it is fairly retentive.

Diameter, cm	9	11	12½
Per pkg. (100 sheets)	**$ .96**	**1.23**	**1.36**

J.H. MUNKTELL'S UNRIVALLED GENUINE SWEDISH FILTERING PAPER
RECOMMENDED BY THE MOST CLEVER CHEMISTS
BERZELIUS CONSIDERED IT THE BEST IN THE WORLD
No 1F
11 Cm
EACH PACKET CONTAINING 100 FILTERS
THE ASHES OF EACH FILTER 0.00056 GR
IN USE AT THE PRINCIPAL CHEMICAL LABORATORIES

9-925
See also No. 9-930

J.H. MUNKTELL'S UNRIVALLED GENUINE SWEDISH FILTERING PAPER
RECOMMENDED BY THE MOST CLEVER CHEMISTS
BERZELIUS CONSIDERED IT THE BEST IN THE WORLD
No 2
11 Cm
EACH PACKET CONTAINING 100 FILTERS
THE ASHES OF EACH FILTER 0.00074 GR
IN USE AT THE PRINCIPAL CHEMICAL LABORATORIES

9-935

J.H. MUNKTELL'S UNRIVALLED GENUINE SWEDISH FILTERING PAPER
RECOMMENDED BY THE MOST CLEVER CHEMISTS
BERZELIUS CONSIDERED IT THE BEST IN THE WORLD
No 3
11 Cm
EACH PACKET CONTAINING 100 FILTERS
IN USE AT THE PRINCIPAL CHEMICAL LABORATORIES

9-940

9-925. FILTER PAPER, Munktell No. 1F, Unwashed, Medium. This paper has a medium texture which make it fairly rapid and fairly retentive. It is adapted to general laboratory work, and is the most used grade of Munktell unwashed paper.

Diameter, cm.	9	11	12½	15
Per pkg. (100 sheets)	$ .52	.66	.88	1.09

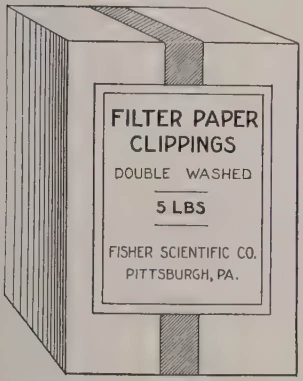
9-930. FILTER PAPER, Munktell No. 1F, Large Sheets. The same paper as described under No. 9-925, but cut in large sheets 48 x 48 cm. square.
Per quire (24 sheets) $ 2.60
Per ream (480 sheets) $43.20

9-935. FILTER PAPER, Munktell No. 2, Unwashed, Soft. This paper has a softer texture than No. 9-925 and filters more rapidly, but it is not so retentive.

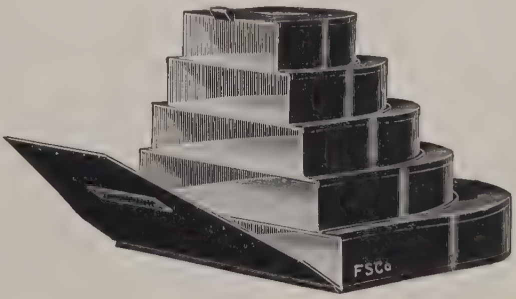
Diameter, cm.	9	11
Per pkg. (100 sheets)	$ .51	.62

9-940. FILTER PAPER, Munktell No. 3, Unwashed, Heavy. This paper has a soft texture and is thicker than No. 9-935. It filters fairly rapidly, and on account of its thickness is quite retentive; it is stronger than No. 9-925 or No. 9-935.

Diameter, cm.	9	11
Per pkg. (100 sheets)	$ .34	.45



9-945



9-950

9-945. FILTER PAPER, Clippings, Double-Washed; clean and free from foreign matter.

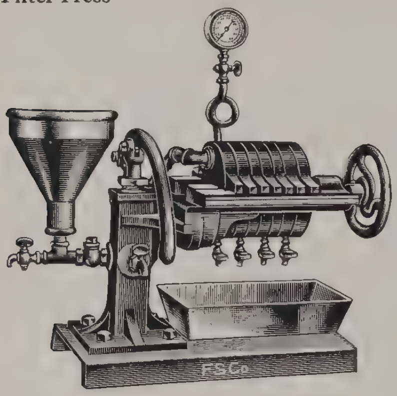
A pulp made of this paper makes a good filtering mat for use in a Gooch crucible or a Buchner funnel, or it can be used in the ordinary 60° funnel when supported by a No. 9-780 Filter Disc. Solutions with very fine particles which are difficult to filter directly through a paper, can be easily filtered by mixing the solution with fine cut pieces of this paper, or by mascerating the paper directly in the solution. This acts as an absorbent or coagulent. The fine particles adhere to the particles of paper in the solution, and it is then readily filtered through a paper. Used in the same way, it will separate some oil and water emulsions.

This paper put up in one (1) pound and in five (5) pound sealed boxes. **Per 1 pound box, $ .75**
Per 5 pound box, $3.25

FILTER PAPER THIMBLES, see Extraction Thimbles No. 9-655, page 327.

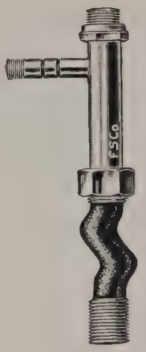
9-950. FILTER PAPER CASE. Made of japanned tin for holding five (5) different sizes of papers from 7 cm. to 18½ cm. diameter. This case keeps broken packages of papers clean and unsoiled, and by opening the door, all sizes are quickly available; the door is held tightly closed by the clasp on the top. **Each, $4.00**

Filter Press

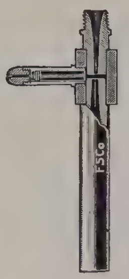


9-955

9-960



9-965



9-970

9-975

9-980

9-955. FILTER PRESS, Laboratory, for laboratory filtrations and for experimental work. This press is designed with flush tube, corrugated surface plates and extension frames so that either cloth or filter paper can be used as filtering medium. It is suitable for working pressures up to 150 pounds per square inch, permitting tests to be made under the same pressures as are used in the large size commercial presses.

Consists of 2 head plates; 2 filter plates; 3 extension frames; reservoir; hand pump with brass valve; pressure gauge; syphon; pan; filter cloth and filter paper. It is made of iron, fitted with brass valves. The plates and frames are 6 inches outside diameter and 5 inches inside diameter; frames are ⅞ inches wide for holding solids or residuum. Weight about 120 pounds. **Each, $90.00**

9-960. FILTER PUMP, Swirling (*patented*). An aspirator made of brass, which uses the water supply in the laboratory for creating a continuous suction as is used for filtering under reduced pressure, and for creating a moderate degree of vacuum for many different laboratory operations. The swirling motion imparted to the water in this style pump, entrains the air drawn in the suction tube and increases the efficiency of the pump. These pumps can be permanently fitted in the water supply with the outlet connected to (or dipping into) a waste line: or they can be attached to a laboratory faucet by couplings No. 9-975 or No. 9-980. The capacities vary with the size; size B is the one most used.

Size	A	B	C
Length, inches	3¾	4¾	5⅜
I. P. thread connection, inch	⅛	¼	⅜
Each	**$1.35**	**1.60**	**1.95**

9-965. FILTER PUMP, Richards, used in the same manner and for the same purposes as No. 9-960. These pumps are made of brass and have air entraining tubes at the bottom which divert the course of the water from side to side, and thus create a higher vacuum by entraining the air bubbles, and making it more difficult for the air to be drawn back to suction tube.

The small size "A" pump has the air entraining tube made of a bent lead pipe; the entraining tubes on the B and C sizes are brass castings; size B, which is illustrated, is the one most used. Size C is very large and heavy and is often permanently installed so that one or more vacuum connections can be made; this size C has a larger capacity than any of the other pumps listed.

Size	A	B	C
Length of pump (without tube), inches	3	4	6½
Length over all, inches	6½	7	13
I. P. thread connection, inch	⅛	⅜	¾
Each	**$2.00**	**2.60**	**8.00**

9-970. FILTER PUMPS, Chapman. Simple and less expensive pumps, made of brass, not so efficient as No. 9-960 and No. 9-965 Pumps. They are used in the same manner and for the same purposes as mentioned under No. 9-960.

Size	A	B	C
Length, inches	3⅜	4¾	5⅜
I. P. thread connection, inch	⅛	¼	¼
Each	**$1.25**	**1.40**	**1.65**

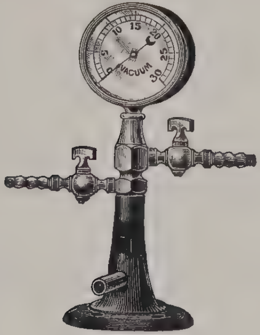
9-975. FILTER PUMP COUPLINGS, Threaded; for connecting the pumps listed to a threaded faucet or any other standard hydrant-threaded connection.

Size A coupling fits the size A Pumps No. 9-960, No. 9-965 or No. 9-970.
Size B coupling fits size B Pumps No. 9-960; also sizes B and C Pumps No. 9-970.
Size C coupling fits size C Pump No. 9-960; also size B Pump No. 9-965.
Size D coupling is a special one for size C Pump No. 9-965; it is made hexagonal for tightening with a wrench.

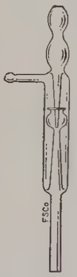
Size	A	B	C	D
For pump with I. P. thread, inch	⅛	¼	⅜	¾
Each	**$.40**	**.40**	**.40**	**.90**

9-980. FILTER PUMP COUPLINGS, Smooth, for connecting filter pumps to smooth faucets.

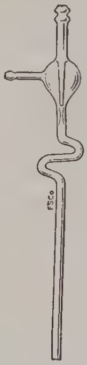
Size	A	B	C
For pump with I. P. thread, inch	⅛	¼	⅜
Each	**$.60**	**.60**	**.60**



9-985



9-990



9-993

9-985. FILTER PUMP, on Stand, with vacuum gauge, hose connections for water and vacuum, and a stopcock on each connection; with outlet to connect with the waste. This pump can be set up at any convenient place on the laboratory table and suction started by turning the stopcocks; degree of vacuum can be adjusted by observing the gauge and adjusting the stopcocks. By closing the vacuum stopcock before closing the water stopcock, the water from the pump will not back through the suction line into the apparatus. **Each, $14.50**

9-990. FILTER PUMP, Muencke; made of glass, with aspirator sealed in jacket 115 mm. long; with water inlet and suction tubes adapted to take rubber tubing. The outlet tube has a sealed-in glass baffle which spreads the water stream and thus entrains the air, thereby making this pump more efficient. Length over all, 250 mm. **Each, $1.80**

9-993. FILTER PUMP, Geissler; simple form, made of glass with outlet tube shaped to entrain the air. Length over all, 300 mm. **Each, $1.40**

FILTER TUBES, see Crucible Holders No. 8-260.

9-995

10-000

9-995. FINGER COTS, Asbestos. Made of heavy asbestos; very convenient for handling all kinds of hot utensils and apparatus.

Style	A	B
For	fingers	thumb
Each	**$ .15**	**.15**
Per dozen	**$1.50**	**1.50**

10-000. FINGER COTS, Rubber. Made of heavy rubber: protect the fingers from chemicals in handling and pouring from test tubes, flasks, etc.; also provide a moderate degree of heat insulation.

Size	A	B	C
For	small fingers	large fingers	the thumb
Each	**$.10**	**.10**	**.10**
Per dozen	**$.90**	**.90**	**.90**

Fire Extinguishers

10-005

10-015

10-025

10-005. FIRE EXTINGUISHER, Pyrene Portable, for extinguishing fires in the vicinity of electric wires, motors, dynamos, etc. This is the only safe type of fire extinguisher for "electrical" fires. The liquid is a non-conductor of electricity and can, therefore, be used without danger of shock to the operator—it will not injure the equipment—it is highly volatile, blankets the fire, shutting out the air and smothering the flame. Pyrene is also used for fires of oil, paint, varnish, solvents, cleaning solutions, and all inflammable materials. The extinguisher is operated like a double-acting pump, and delivers a continuous stream of liquid regardless of the position in which the extinguisher is held. It will not freeze even at 50 degrees below zero Fahrenheit, needs no attention except after use, and is endorsed by the Underwriters Laboratories.

Pyrene Fire Extinguisher, brass finish, complete with wall bracket. **Each, $12.00**

10-010. FIRE EXTINGUISHER RECHARGE, for refilling No. 10-005 Fire Extinguisher. This liquid is supplied in cans, and is charged into the extinguisher by unscrewing a small plug in the top of the extinguisher and pouring in the liquid. **Per Quart Can, $1.80**
Per Gallon Can, $7.20

10-015. FIRE EXTINGUISHER, Phomene; for use in oil and inflammable solvent fires. This extinguisher is of the soda-and-acid type, but has a special foam producer incorporated in the liquid. As the extinguisher is turned upside down, the carbon dioxide generated is expelled and blows the liquid containing the foam into a blanket of bubbles of carbon dioxide. The foam is very strong and persistent and excludes the air from the fire. If a bubble is broken, the carbon dioxide escapes and it, in turn, blankets the fire with an inert incombustible gas. The blanket is thus both air-tight and fireproof. When the fire is once extinguished it cannot reignite because the blanket remains intact for a long time. After all danger of fire is over, the dried foam may be brushed away without damage to the furniture or equipment of the laboratory. Each extinguisher generates about 20 gallons of foam and 2½ gallons of liquid.

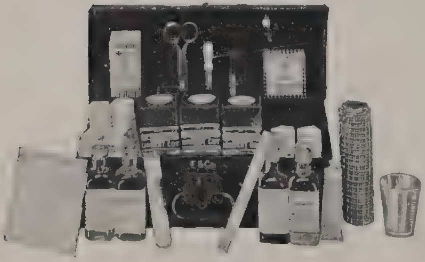
Phomene Fire Extinguisher, 2½ gallon size, complete with charge and wall bracket. **Each, $25.00**

10-020. FIRE EXTINGUISHER RECHARGE, Phomene; for refilling No. 10-015 Phomene Fire Extinguisher. The complete set of chemicals for refilling the extinguisher is packed in an individual carton. The extinguisher can be easily recharged by simply following the directions on the carton. **Recharge, Each, $1.75**

10-025. FIRST AID CABINET. A most complete outfit for first aid, in a compact, white enameled metal cabinet, 17½x12x4 inches. Everything is put up in a way that it is kept clean and is quickly available when it is urgently needed. A chart on the inside of the lid tells what to do and what to use for first aid in the case of different kinds of burns, heat prostrations, fainting, electrical shocks, treatment of different wounds, etc.

The case contains 20 pkgs. of gauze, tourniquet, 24 gauze bandages, wire splints, adhesive plaster, tweezers, scissors, medicine dropper, eyecup, medicine glass, etc.; also aromatic spirits of ammonia, burn ointment, eyewash, tincture of iodine, hydrogen peroxide, etc.

We have supplied these cabinets to a large number of laboratories and reports of the valuable use they have been put to, prompts us to suggest that it should be in every laboratory. **Each, $12.00**



10-030

10-030. FIRST AID KIT. A smaller and more compact equipment in metal case, containing all of the most used materials in Cabinet No. 10-025, but in smaller quantities. The first aid instructions are on a sheet contained in the kit. **Each, $7.00**

FIXANAL PREPARATIONS, see Fixanal in Reagent List in the rear of this catalogue.

FLASKS

10-035

REGARDING PYREX FLASKS

Pyrex is a special, low expansion, borosilicate glass which combines thermal resistance, high softening point, chemical stability, and mechanical strength.

All Pyrex glassware described in this catalogue is carried in stock, and supplied at a saving in cost to the user. We do not charge for cases, which at the factory charges amounts to from 3% to 15% of the price of the glassware.

We are Distributing Agents for Pyrex Glassware; our requirements are manufactured in advance of our needs, and received in carload lots. Our prices are f. o. b. Pittsburgh, and shipping along with other laboratory requirements, effects a saving in transportation. Our discounts on Pyrex Glassware are:

Full case lots	**10% discount**
50 case lots	**10 and 10% discount**
100 case lots	**10 and 15% discount**

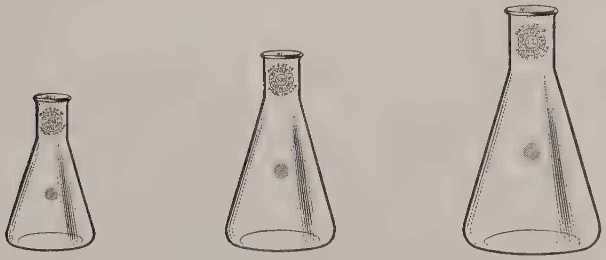
10-035. FLASKS, Florence Form, Pyrex Glass, with flat bottoms and vial mouths. Of the globe-shaped boiling flasks, this style is the one most used.

*Capacity, ml	50	125	250	500	1000
Takes rubber stopper No	0	1	3	6	7
Number of flasks to a case	192	168	144	72	36
Each	**$.17**	**.19**	**.24**	**.30**	**.43**

Case lots, 10% discount.

*Capacity, ml	2000	3000	6000	12000
Takes rubber stopper No	8	9	10	10
Number of flasks to a case	18	12	12	6
Each	**$.60**	**.76**	**1.60**	**3.30**

Case lots, 10% discount.



10-040

10-040. FLASKS, Erlenmeyer Form, Pyrex Glass, with vial mouths. This is the most popular style of the conical-shaped flasks.

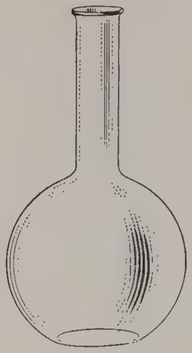
*Capacity, ml	50	125	200	300	500
Takes rubber stopper No	1	3	5	6	6
Number of flasks to a case	120	180	144	132	72
Each	**$.16**	**.18**	**.20**	**.25**	**.29**

Case lots, 10% discount.

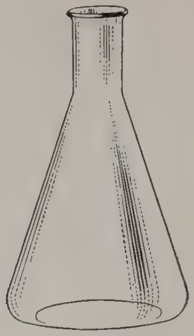
*Capacity, ml	1000	2000	3000	4000	6000
Takes rubber stopper No	8	10	10	10	10
Number of flasks to a case	36	24	15	12	6
Each	**$.42**	**.60**	**.79**	**1.00**	**1.60**

Case lots, 10% discount.

**Sizes recommended by the American Chemical Society, Standardization Committee.*



10-045



10-050

10-045. FLASKS, Florence Form, Resistance Glass, with flat bottoms and vial mouths; the popular style of boiling flask. This grade of glass is less expensive and is often used for students' work, and for operations where the requirements are not so severe.

Capacity, ml	125	250	500	1000
Number of flasks to a case	120	160	90	50
Each	**$.15**	**.17**	**.20**	**.29**

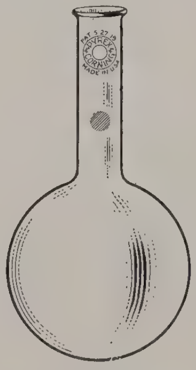
Case lots, 10% discount.

10-050. FLASKS, Erlenmeyer Form, Resistance Glass, with vial mouths; the popular style of conical-shaped flask. This grade of glass is less expensive and is often used for students' work, and for operations where the requirements are not so severe.

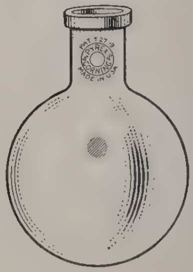
Capacity, ml	60	125	250	500	1000
Number of flasks to a case	190	120	160	90	50
Each	**$.13**	**.15**	**.17**	**.20**	**.29**

Case lots, 10% discount.

10-055



10-060



10-065

10-055. FLASKS, Flat Bottom, Ring Neck, Pyrex Glass. The heavy ring of glass at the mouth of each flask increases the mechanical strength, prevents breakage in stoppering and provides a means for wiring corks or rubber stoppers. The rim of the neck is ground flat.

*Capacity, ml	500	1000	2000	3000	6000
Takes rubber stopper No	6	7	8	9	10
Number of flasks to a case	72	36	18	12	12
Each	**$.38**	**.55**	**.78**	**.99**	**1.75**

Case lots, 10% discount.

10-060. FLASKS, Round Bottom, Vial Mouth, Pyrex Glass. Except for the round bottoms, the general style of these boiling flasks is similar to that of the Florence Form.

*Capacity, ml	100	200	300	500	1000	2000
Takes rubber stopper No	2	3	4	4	6	9
Number of flasks to a case	84	144	84	48	30	18
Each	**$.18**	**.22**	**.28**	**.37**	**.56**	**.79**

Case lots, 10% discount.

10-065. FLASKS, Round Bottom, Short Ring Neck, Pyrex Glass. Sometimes called "Balloon Flasks."

*Capacity, ml	200	500	1000	2000	3000	5000	12000
Takes rubber stopper No	3	6	8	10	10	11	11
Number of flasks to a case	144	72	36	18	12	6	6
Each	**$.28**	**.38**	**.55**	**.78**	**.99**	**1.40**	**3.50**

Case lots, 10% discount.

**Sizes recommended by the American Chemical Society, Standardization Committee.*

10-070

10-075

10-080

10-085

2-565

10-070. FLASK, Sulphur, Johnson, Pyrex Glass, as used in steel laboratories for routine Sulphur Determinations; capacity 275 ml., with flat bottom and heavy ring neck with ground rim; takes a No. 6 rubber stopper. The heavy ring neck adds mechanical strength and permits tight stoppering, without much risk of breakage. When purchased in case lots of 108 flasks, 10% discount is allowed. **Each, $.32**

10-075. FLASK, Copper Determination, Pyrex Glass; used in copper laboratories; capacities 250 ml., with flared top and flat bottom. A No. 6 rubber stopper fits the neck. When purchased in case lots of 108 flasks, 10% discount is allowed. **Each, $.30**

10-080. FLASK, Phosphorus, Resistance Glass; used in iron laboratories for precipitating phosphorus. The shape is conical; a tall Erlenmeyer Form; contains about 400 ml. to the base of the neck and takes a No. 4 rubber stopper.
Each, $.25
Lot of 100, 10% discount

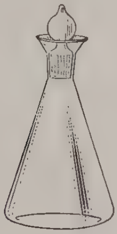
10-085. FLASKS, Assay, High Form, Resistance Glass, conical shape, with lip for pouring; taller than No. 2-565 Flasks.

*Capacity, ml	125	250	500
Each	$.18	.24	.28

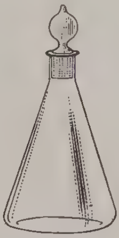
2-565. FLASKS, Assay, Low Form, Resistance Glass; sometimes called "Phillips Beakers," conical shape, with lip for pouring. This shape is lower and wider than No. 10-085 Flasks.

*Capacity, ml	125	250	500
Each	$.22	.26	.33

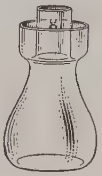
10-090



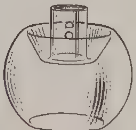
10-095



10-100



10-105



9-565

10-090. FLASKS, Wide Mouth, Erlenmeyer, Pyrex Glass, conical shape, with heavy glass lip at the mouth; suitable, among other uses, as flasks for extraction and gas generating experiments.

*Capacity, ml	250	500
Takes rubber stopper No	8	10
Number of flasks to a case	137	60
Each	$.22	.29

Case lots, 10% discount.

10-095. FLASKS, Iodine Mercury Seal, Resistance Glass; used for obtaining the Iodine Absorption Number according to the methods of either Hanus or Wijs, as given in the *Association of Official Agricultural Chemists Methods of Analysis of Fats in Oils, 1919, page 244.* The flasks are conical in shape, with hollow glass stoppers ground deeply into the necks to make provision for a mercury seal.

*Capacity, ml	125	250	500
Each	$.60	.80	1.00

10-100. FLASKS, Glass Stoppered, Erlenmeyer; for use with volatile or hydroscopic liquids.

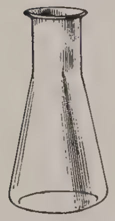
*Capacity, ml	125	250	500
Each	$.40	.60	.80

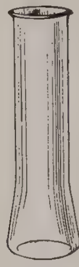
10-105. FLASK, Extraction, Sy, with holes in neck; made of resistance glass, conical shape, with trough around neck for mercury seal and two holes conveniently placed in the neck for the return of ether to the flask. Can be used in place of Knorr flask with extraction apparatus. Capacity about 150 ml. **Each, $.75**

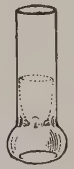
9-565. FLASK, Extraction, Knorr, with holes in neck; made of resistance glass, globe shape, with base of neck countersunk to form a trough for mercury seal and with two holes conveniently placed in the neck for the return flow of ether to the flask; as modified by Walter and Goodrich. Capacity to shoulder about 150 ml. **Each, $.85**

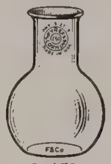
**Sizes recommended by the American Chemical Society, Standardization Committee.*

Flasks


9-595
See also No. 9-600


1-650


9-633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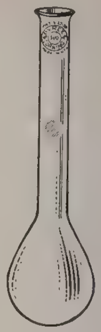

10-110

9-595. FLASK, Rubber Extraction, Resistance Glass; conical shape, capacity about 400 ml. to base of neck, made in accordance with the specifications of the Joint Rubber Insulation Committee. Used with Extraction Apparatus No. 9-585. **Each, $.25**

9-600. FLASK, Rubber Extraction, Pyrex Glass; similar to No. 9-595, but made of Pyrex Glass. **Each, $.32**

1-650. FLASK, Bitumen Extraction, A. S. T. M., conical shape with long straight neck; capacity about 150 ml. to base of neck, as used in the Determination of Matter-Insoluble-in-Benzol. Used with Extraction Apparatus No. 1-645. **Each, $.60**

Dozen lots, 10% discount.

9-633. FLASK, Extraction, Bailey-Walker Form. Designed to accommodate the Bailey-Walker Condenser No. 9-631 and to take the No. 9-632 Syphon Cup, or a 25 ml. Porcelain Crucible No. 8-195. **Each, $.90**

9-650. FLASKS, Extraction, Pyrex Glass, with wide necks, flat bottoms and vial mouths; generally used to contain the solvent in Soxhlet and similar extraction apparatus.

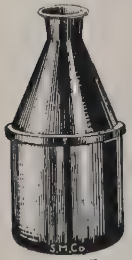
Capacity, ml	100	150	250	500
Takes rubber stopper No	6	7	8	10
Number of flasks to a case	120	108	120	60
Each	**$.18**	**.19**	**.20**	**.29**

Case lots, 10% discount.

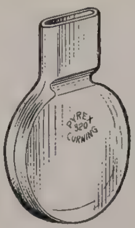
10-110. FLASKS, Kjeldahl, Pyrex Glass, with round bottoms, long necks and vial mouths; used in the determination of nitrogen in organic matter, such as fertilizer, meat, leather, etc., by digestion in sulphuric acid, as specified in the *Methods of the Official Agricultural Chemists, 1919, pages 5 to 8.* The physical properties of Pyrex glass are those required for Kjeldahl flasks; we carry no other grade in stock.

*Capacity, ml	300	500	800
Length over all, approx., mm	300	325	365
Takes rubber stopper No	5	6	7
Number of flasks to a case	60	36	36
Each	**$.28**	**.37**	**.45**

Case lots, 10% discount.


10-115

10-120


10-125

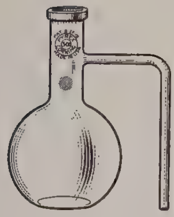
10-115. FLASK, Kjeldahl, Polished Copper, straight sides, heavily constructed. Capacity about 1000 ml.; height over all 215 mm.; diameter 100 ml. The bottom is flat and the neck slightly flared to take Rubber Stopper No. 9. **Each, $4.80**

10-120. FLASKS, Polished Copper, with heavy brass ring necks, with rounded sides, flat bottoms and heavily constructed; often used for Kjeldahl determinations.

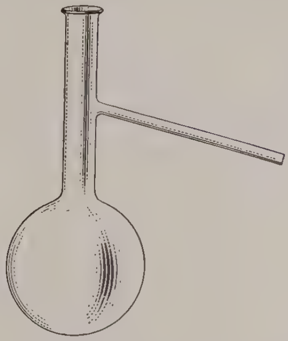
Capacity, ml	500	1000
Height over all, mm	160	190
Inside diameter of neck, mm	24	24
Takes rubber stopper No	5	5
Each	**$2.90**	**3.70**

10-125. FLASK, Culture, Kolle, Pyrex Glass, with indented neck and two parallel flat walls; total capacity to base of neck 320 ml.; greatest diameter 135 mm.; outside distance between the flat walls 35 mm. When the flask is placed flat on its side in the incubator, the indentation, on the under side, at the base of the neck, permits 100 ml. of culture medium to remain in the flask. Used by the U. S. Army Medical School in the preparation of typhoid and paratyphoid vaccines. A 10% discount is allowed from the price below in case lots of 84 flasks. **Each, $.75**

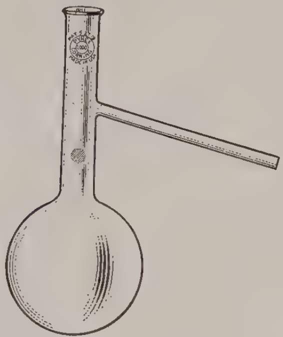
*Sizes recommended by the American Chemical Society, Standardization Committee.



10-130



10-135



10-140

10-130. FLASK, Sulphur, Pyrex Glass, with delivery tubes; with flat bottom, heavy ring neck and delivery tube bent at right angles and extending to a line about equal to the base of the flask. This flask has been found useful in generating gases and for use with vertical condensers in distillations. Capacity 500 ml. to fit No. 5 Rubber Stopper. A 10% discount is allowed in case lots of 40 flasks. **Each, $ .75**

10-135. FLASKS, Distilling, Resistance Glass, with round bottoms, vial mouths and vapor tubes placed at a 75° angle about the middle of the neck.

Capacity, ml	125	250	500	1000
Number of flasks to a case	40	40	30	20
Each	**$ .40**	**.50**	**.60**	**.95**

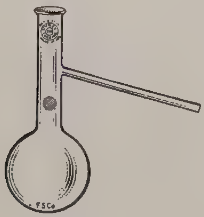
Case lots, 10% discount.

10-140. FLASKS, Distilling, A.C.S., Pyrex Glass, with round bottoms and vial mouths; made according to the recommendation of the American Chemical Society. The vapor tubes are placed at a 75° angle and, in all capacities from 25 ml. to 1000 ml., inclusive, are attached to the necks with the centers of the vapor tubes 77 mm. below the mouths of the flasks. This is specified by the Manufacturing Chemists Association so that each of these distilling flasks can be used with a 75 mm. immersion of the thermometer. On the 2000 ml. and 3000 ml. flasks, the vapor tubes are placed in the middle of the necks.

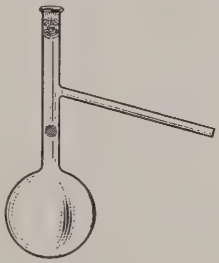
*Capacity, ml	25	50	125	200	250	500	1000	2000	3000
Takes rubber stopper No.	1	1	3	4	3	4	6	9	10
Number of flasks to a case.	24	24	24	36	24	18	12	6	6
Each	**$ .36**	**.40**	**.50**	**.55**	**.60**	**.70**	**1.20**	**1.70**	**2.25**

Case lots, 10% discount.

NOTE: *The 200 ml. A. C. S. Distilling Flask is the flask that we formerly called the Barrett-Benzol Flask (see Ind. & Eng. Chem., December, 1918). The Barrett Co. is now using the No. 6-870 Flask.*



6-870



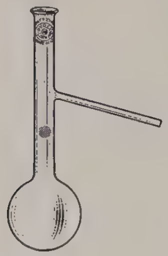
6-915

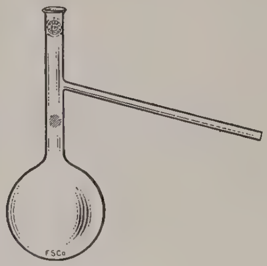
6-870. FLASK, Distilling, Standard Benzol, Pyrex Glass, 200 ml. This is the flask used for the analytical distillation of benzols with our standard Benzol Distilling Apparatus No. 6-865. It is recommended by the Chemical Committee of the American Gas Association (see *Gas Chemists Handbook, 1922, page 307*); it is used by The Barrett Co., The Koppers Co. and The U. S. Steel Corp.

The outside diameter of the bulb is 76 mm.; the neck is 105 mm. long by 23 mm. outside diameter and the vapor tube, 127 mm. long, is placed in the middle of the neck, at a 75° angle. When ordered in case lots of 54 flasks, a 10% discount is allowed. **Each, $ .55**

6-915. FLASK, Distilling, Tar Test (Road Materials), Pyrex Glass, capacity 250 ml., with round bottom and vial mouth. The neck of the flask is longer and somewhat narrower than that of the regular distilling flask. The outside diameter of the bulb is 80 mm.; the neck is 150 mm. long by 17 mm. outside diameter; the vapor tube is 150 mm. long by 9 mm. outside diameter and is placed in the middle of the neck at a 75° angle. This flask is now considered the Standard Road Materials Distillation Flask and has been adopted by the American Society for Testing Materials, *Test No. D20-24, Distillation of Bituminous Road Materials, A. S. T. M. Standards 1921* and is also specified by the U. S. Dept. of Agriculture, *Bureau of Public Roads, Bulletin No. 949, page 50, October, 1921.* A 10% discount is allowed, when ordered in case lots of 48 flasks. **Each, $ .70**

**Sizes recommended by the American Chemical Society, Standardization Committee.*


10-145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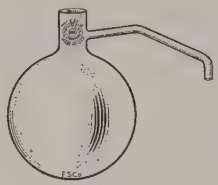
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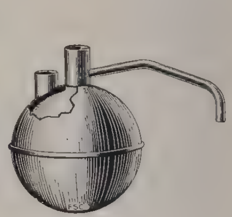

10-160

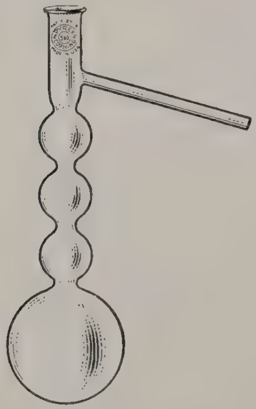
10-145. FLASK, Distilling, Engler, Pyrex Glass, 100 ml., with round bottom and vial mouth. This is the standard Engler distilling flask, with the vapor tubes placed at a 75° angle in the middle of the neck; the neck is longer and somewhat narrower than that of the regular distilling flask. The neck is 150 mm. long with an inside diameter of 16 mm.; the bulb of the flask is 65 mm. outside diameter. See *Bureau of Mines Method No. 100-12, Distillation of Gasoline, Kerosene and Other Light Oils, U. S. Dept. of the Interior Technical Papers No. 323 and 323-A.* This is the standard flask for A. S. T. M. *Test for Gasoline and Light Oils, D86-24T.* A 10% discount is allowed, when ordered in case lots of 54 flasks. **Each, $.60**

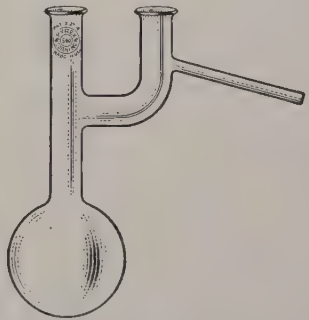
NOTE. *Flasks of other sizes or specifications should not be called "Engler Flasks."*

10-150. FLASK, Distilling, A. S. T. M. Gas Oil, Pyrex Glass, 250 ml. Adopted by the American Society for Testing Materials, for the Distillation of Gas Oils, see *Tentative Standards for 1924, Serial Designation D158-23T.* (So-called Saybolt Flask.) Outside diameter of bulb 86 mm.; length of neck 130 mm. by 17 mm. outside diameter; the vapor tube is 175 mm. long and is placed in the middle of the neck at a 75° angle. When ordered in case lots of 36 flasks, a 10% discount is allowed. **Each, $.70**

10-155. FLASK, Brown-Duvel Moisture Test, Pyrex Glass; used for the determination of moisture in **corn and whole grains;** capacity 1000 ml., with round bottom and short straight neck, without lip; to take a No. 5 Rubber Stopper. The side-tube is bent to fit the Official Brown-Duvel Moisture Testers, as specified in Circular No. 72 and other bulletins of the U. S. Department of Agriculture, Grain Standardization Division. A 10% discount is allowed, when ordered in case lots of 36 flasks. **Each, $1.50**

10-160. FLASK, Brown-Duvel Moisture Test, Polished Copper, double wall, as used in the determination of moisture in flour and ground grain substances; capacity of inner flask about 900 ml. The two necks and side-tube are of brass and the entire flask made as recommended in Circular No. 56, U. S. Bureau of Plant Industry. The space between the walls is to be partially filled with oil to prevent scorching of contents of inner flask. A No. 5 Rubber Stopper fits either neck. **Each, $9.50**


10-165

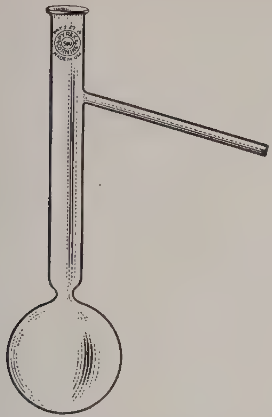

10-170

10-165. FLASK, Distilling, Ladenburg, Pyrex Glass, with three bulbs in the neck to increase the refluxing area, which is desirable in fractionating liquids whose boiling points lie close together. Capacity, 500 ml.; vapor tube attached at a 75° angle. A 10% discount is allowed, when ordered in case lots of 12 flasks. **Each, $2.40**

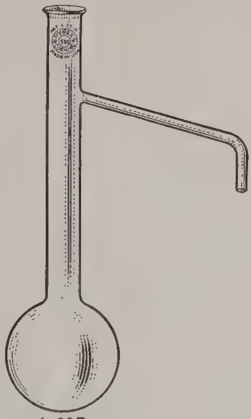
10-170. FLASKS, Distilling, Claissen, Pyrex Glass, with two necks. The vapor tube is placed at 75° angle on the auxiliary neck, leaving the regular neck free for introducing solid and other materials during the reaction or distillation.

*Capacity, ml	125	250	500	1000
Number of flasks to a case	36	30	24	12
Each	**$1.44**	**1.62**	**2.00**	**2.80**

Case lots, 10% discount.



6-906



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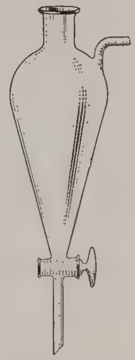
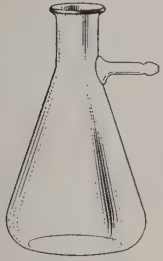


10-173

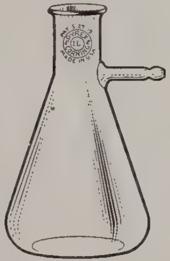
6-906. FLASK, Distilling, Hempel, with constriction, Pyrex Glass. The constriction at base of the neck facilitates the use of glass beads, for greater refluxing area; with straight vapor tube placed at an angle of 75°; capacity 500 ml. See *U. S. Dept. of Agriculture, Forest Service Circular No. 112, Test H-13*, and *Journal of Ind. & Eng. Chemistry, Vol. X, page 41, November, 1918.* A 10% discount is allowed, when ordered in case lots of 12 flasks. **Each, $1.60**

6-907. FLASK, Distilling, Hempel, Pyrex Glass, with extra long neck to increase refluxing area. The vapor tube is placed at an angle of 75° and bent at the end for use with a vertical condenser. Used in the analytical distillation of petroleum; see *U. S. Bureau of Mines Bulletin No. 125.* Capacity 500 ml. A 10% discount is allowed, when ordered in case lots of 12 flasks. **Each, $1.40**

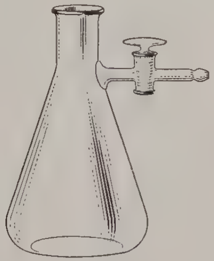
10-173. FLASKS, Filtering, Shaw, Resistance Glass; similar in shape to a Squibb separatory funnel, with suction tube, large bore stopcock and neck to take a No. 5 rubber stopper. Capacity about 400 ml. and very convenient for removing the filtrate at intervals without disconnecting the apparatus. See full discussion in *Journal of Industrial and Engineering Chemistry, 1917, August issue. "A New Filter Flask," by Jos. A. Shaw.* **Each, $4.00**



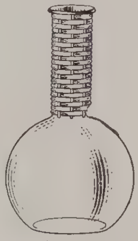
10-175



10-180



10-185



10-195

10-175. FLASKS, Filtering, with side tube, Resistance Glass, conical shape, made of heavy glass to withstand moderate vacuum.

*Capacity, ml	250	500	1000	2000
Number of flasks to a case	60	40	20	20
Each	**$ .55**	**.63**	**.96**	**1.60**

Case lots, 10% discount.

10-180. FLASKS, Filtering, with side tube, Pyrex Glass, conical shape, made of heavy glass to withstand moderate vacuum.

Capacity, ml	250	500	1000	2000
Takes rubber stopper No.	6	6	7	9
Number of flasks to a case	96	60	24	15
Each	**$ .70**	**.95**	**1.45**	**2.40**

Case lots, 10% discount.

10-185. FLASKS, Filtering, with stopcock on side-neck, Resistance Glass, conical shape; made of heavy glass to withstand moderate vacuum. The glass stopcock provides a ready means for quickly shutting off the flask from the source of vacuum to prevent backing when the pump is shut off.

*Capacity, ml	500	1000
Number of flasks to a case	14	6
Each	**$2.24**	**3.74**

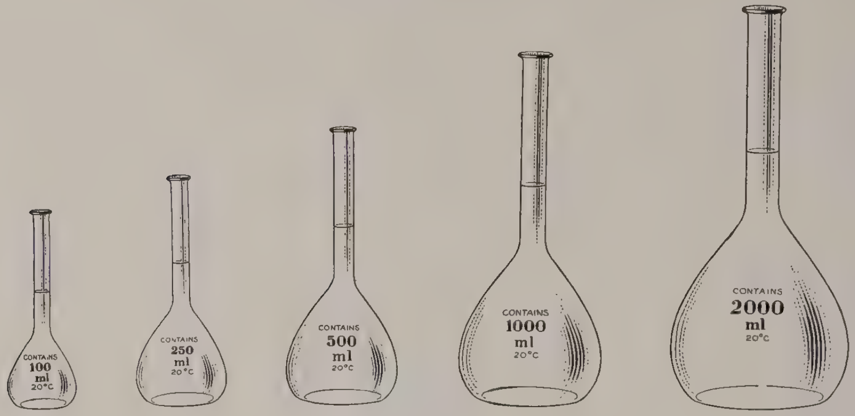
Case lots, 10% discount.

10-195. FLASKS, Wicker Covered Necks, Resistance Glass, convenient for handling hot solutions, for making washing bottles, etc.

Capacity, ml	500	1000
Each	**$ .90**	**1.10**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

VOLUMETRIC FLASKS



10-200

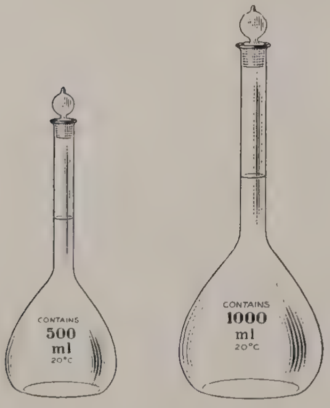
Our Volumetric Flasks are graduated on the basis of the liter—the unit of capacity equivalent to the volume occupied by the mass of one (1) kilogram of pure water at its maximum density, 4° C. (practically). It is then adjusted to 20° C. which is the standard temperature adopted by the U. S. Bureau of Standards. One-thousandth part of this liter is the milliliter, abbreviated "ml."

Volumetric Flasks No. 10-200 and No. 10-205 are made to comply with the requirements for the usual volumetric analysis, and although each flask is not rechecked, a number are checked for control purposes, to tolerances twice those adopted by the U. S. Bureau of Standards for Certified Flasks (see No. 10-220).

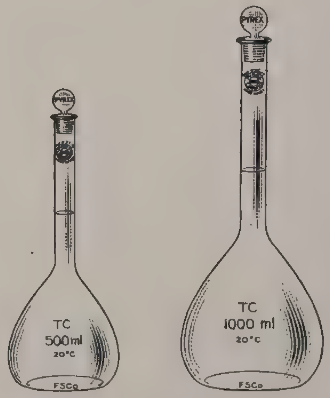
10-200. FLASKS, Volumetric, Unstoppered, graduated "to contain"; for the usual volumetric analysis. These volumetric flasks are used for all routine, industrial and educational work.

Capacity, ml	25	50	100	200	250	500	1000	2000
Each	**$.38**	**.40**	**.45**	**.53**	**.58**	**.68**	**1.00**	**1.80**

Dozen lots of a size, 10% discount.



10-205



10-210

10-205. FLASKS, Volumetric, Glass Stoppered, with ground-in glass stoppers, otherwise similar in quality to No. 10-200.

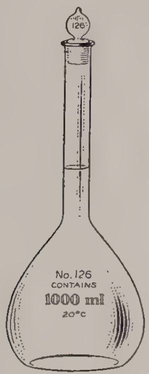
Capacity, ml	25	50	100	200	250	500	1000	2000
Each	**$.60**	**.62**	**.78**	**.85**	**.90**	**1.10**	**1.45**	**2.25**

Dozen lots of a size, 10% discount.

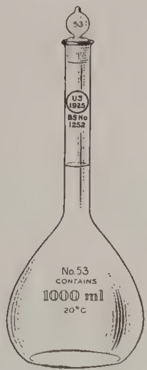
10-210. FLASKS, Volumetric, Pyrex Glass; Glass Stoppered; graduated "to contain"; adjusted for 20° C.

Capacity, ml	100	250	500	1000
Each	**$1.80**	**2.25**	**2.70**	**3.20**

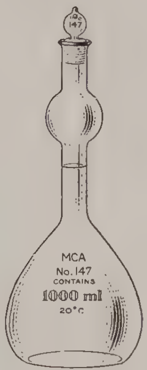
PRECISION VOLUMETRIC FLASKS



10-215



10-220



10-225

10-215. FLASKS, Volumetric, Precision-Uncertified, with ground-in glass stoppers. These flasks have been selected for quality of glass, etc., and have been calibrated according to the method specified by the U. S. Bureau of Standards (Circular No. 9) and with tolerances prescribed by the Bureau.

While these volumetric flasks are manufactured very carefully, we do not guarantee that every Precision-Uncertified volumetric flask will receive the official Control Stamp, if sent to the Bureau. It often happens that the Control Stamp is not obtained because of minor variations even though the accuracy of the flask is well within the tolerances laid down by the Bureau. However, these Precision-Uncertified Flasks are those that we send to the Bureau for certification.

"Factory Certificates" are not supplied, because of their "unofficial" nature. The official Control Stamp of the Bureau is the only accepted standard certification, and for flasks with that official certification, see No. 10-220.

Capacity, ml	50	100	200	250	500	1000	2000
Tolerance, ± ml	.05	.08	.10	.12	.15	.30	.50
Each	**$1.20**	**1.35**	**1.80**	**2.00**	**2.30**	**3.20**	**3.85**

10-220. FLASKS, Volumetric, Precision-Certified, with Official U. S. Bureau of Standards Control Stamp. The glass stoppers are ground-in.

Each of these flasks not only has been made in full accordance with all of the Bureau's specifications as to quality of glass, accuracy, etc., but each flask has received the Official Control Stamp which attests to the fact. Some time ago, the U. S. Bureau of Standards dispensed with issuing certificates for volumetric flasks and other volumetric apparatus with only one graduated mark, because the error found in any piece of this kind, which received the Official Control Stamp, was so small as to be negligible in volumetric analysis.

Capacity, ml	50	100	200	250	500	1000	2000
Tolerance, ± ml	.05	.08	.10	.12	.15	.30	.50
Each	**$3.00**	**3.40**	**3.60**	**4.00**	**4.60**	**5.50**	**6.10**

NOTE: *In cases of extreme necessity, the Bureau will issue certificates for volumetric flasks, stating exactly the contents. When such flasks are required, the customer should count on an extra charge and the delay necessary to have the flasks shipped to the Bureau and for their return.*

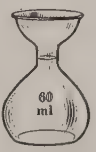
10-225. FLASKS, Volumetric, M. C. A.—Precision Quality, with bulb in the neck and ground-in glass stoppers. The bulb contains about 10% of the graduated portion of the flask (except the 2000 ml. flask, which bulb contains about 5% of the graduated portion). All specifications are according to the Manufacturing Chemists Association. The flasks are calibrated "to contain" and the tolerance for each size is given below.

Capacity, ml	50	100	250	500	1000	2000
Tolerance, ± ml	.05	.08	.11	.15	.30	.50
Each	**$1.70**	**1.80**	**2.10**	**2.60**	**3.15**	**4.50**

10-230. FLASK, Saybolt Viscosimeter, Resistance Glass, graduated at 60 ml., with constricted neck and enlarged mouth; used with the standard Saybolt Viscosimeter for oil testing. **Each, $1.00**

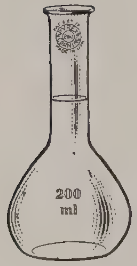
10-235. FLASK, Saybolt Viscosimeter, Pyrex Glass. With the exception of the glass, this flask is the same as No. 10-230. **Each, $1.25**

FLASK, Engler Viscosimeter, see page 494.

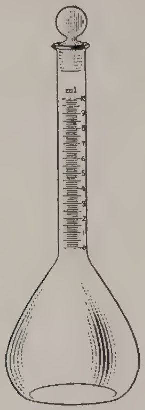


10-230
See also No. 10-235

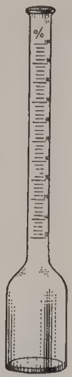
Volumetric Flasks



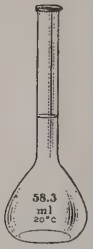
10-240



10-245



6-904



10-250

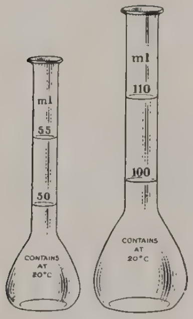
10-240. FLASK, Phosphoric Acid, Pyrex Glass, graduated at 200 ml., made of heavy glass to withstand shaking, with wide neck; used in determining the insoluble phosphoric acid content in fertilizers, etc. **Each, $ .90**

10-245. FLASK, Cassia, neck accurately graduated to 10 ml. in $\frac{1}{10}$ ml. divisions, with ground-in glass stopper. The volume up to the first graduated mark is 100 ml.; used in the official U. S. Pharmacopoeia method for assaying cinnamic aldehyde and in analyzing cassia, cinnamon and clove extracts. This flask is also used for determining the amount of unsaturated constituents in straw oil or similar wash oils, by the sulphonation method. **Each, $1.80**

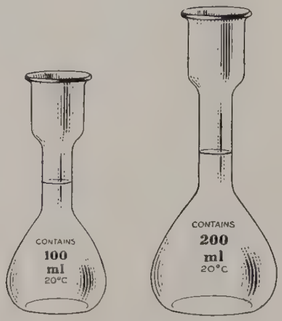
6-904. FLASK, Sulphonation; for determining the degree of unsaturation of hydrocarbons in Benzols, Gasolines and Light Oils. Neck contains 10 ml. and is graduated to 100% in 2% subdivisions. **Each, $ .85**

10-250. FLASK, Miniature Gallon, Alkalinity Test; calibrated "to deliver" 58.3 ml. at 20° C.; used to test the alkalinity or causticity of feed water for boilers. **Each, $ .75**

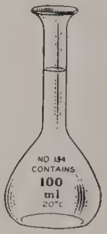
Dozen lots, 10% discount



10-255



10-260



10-265

10-255. FLASKS, Sugar, Two Marks, volume adjusted for use at 20° C.; graduated with two marks on the neck to provide means for making the $\frac{1}{10}$ dilutions, according to the inversion methods in sugar analysis. These flasks are calibrated on the basis of the true or metric liter for use in the standard method for making up solutions for polarization, namely, 26 grams of pure sugar to 100 ml. of polarizing solution. See *Spencer, "Handbook for Cane-Sugar Manufacturers," 168 (1917).*

*Capacity, ml	50–55	100–110	200–220
Tolerance, ± ml	.05	.08	.10
Each	**$ .50**	**.70**	**.90**

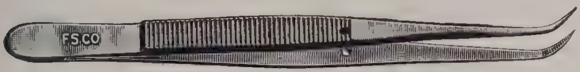
10-260. FLASKS, Sugar, Kohlrausch, with enlarged necks, used in the analysis of filter press cake, adjusted for use at 20° C. On account of the percentage of sugar being small, the tolerances are greater than for flasks used in sugar analysis.

Capacity, ml	100	200
Tolerance, ± ml	.15	.20
Each	**$ .70**	**.90**

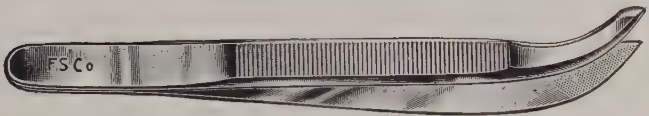
10-265. FLASK, Sugar, Bates, capacity 100 ml., volume adjusted at 20° C., calibrated on the basis of the true or metric liter, for use in making up the standard solution for polarization, namely, 26 grams of pure sugar to 100 ml. of polarizing solution. This flask has been adopted as standard by the U. S. Customs Service and is described in the *U. S. Bureau of Standards Circular No. 44, on Polarimetry.* The height is about 130 mm. and the tolerance ± .08 ml. **Each, $ .75**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

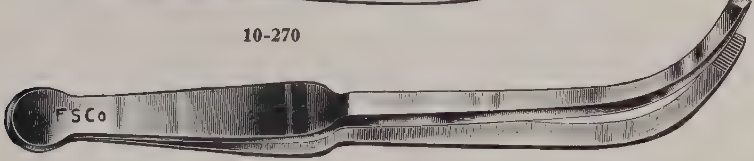
FORCEPS



8-875



10-270

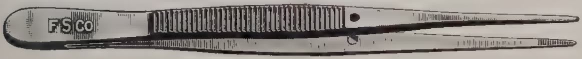


10-275

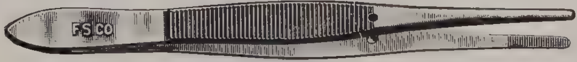
8-875. FORCEPS, Curved, Sharp Points; made of nickel-plated steel, highly polished, with inside of points file-cut. The handles are corrugated and are made with a guide pin. Length over all, 115 mm. **Per pair, $ .70**
Dozen lots, 10% discount

10-270. FORCEPS, Curved, Blunt Points; made of nickel-plated steel, highly polished, with inside of points file-cut. This is sometimes called a Pinning Forcep and used to pin zoölogical specimens in crowded collections. The handles are corrugated and the inside of points double file-cut to firmly hold pins and other small objects. Length over all, 125 mm. **Per pair, $1.30**
Dozen lots, 10% discount

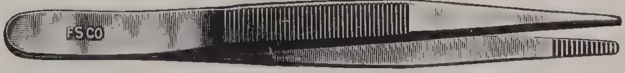
10-275. FORCEPS, Curved (Gooseneck), Very Heavy; made of nickel-plated brass, with inside of points file-cut. These forceps are heavily constructed and easily handled in general laboratory use. Length over all, 150 mm. **Per pair, $ .80**
Dozen lots, 10% discount



8-880



8-885



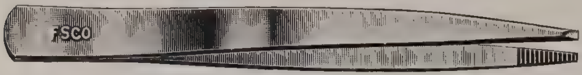
8-890

8-880. FORCEPS, Straight, Sharp Points; made of nickel-plated steel, highly polished, with inside of points file-cut. The handles are corrugated and made with a guide pin. Length over all, 115 mm. **Per pair, $ .65**
Dozen lots, 10% discount.

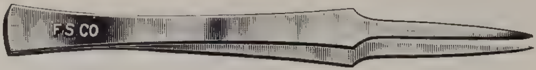
8-885. FORCEPS, Straight, Medium Points; made of nickel-plated steel, highly polished; of slightly heavier construction than No. 8-880, with points broader and rounded. The handles are corrugated and made with a guide pin. Length over all, 115 mm. **Per pair, $ .70**
Dozen lots, 10% discount

8-890. FORCEPS, Straight, Heavy, Blunt Points; made of nickel-plated steel, highly polished, with inside of points deeply file-cut. These forceps are heavy in construction and the broad, blunt points are carefully rounded. The handles are corrugated to insure a firm grip. Length over all, 125 mm. **Per pair, $ .50**
Dozen lots, 10% discount

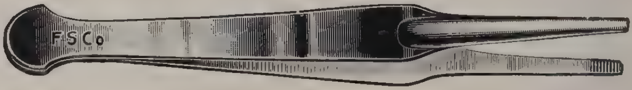
Forceps



8-895



8-900

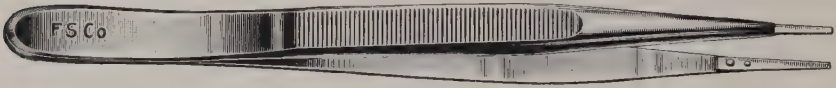


10-280

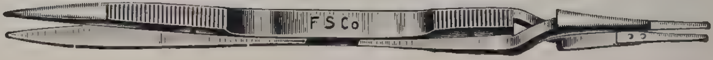
8-895. FORCEPS, Straight, Blunt Points; nickel-plated, with inside of points file-cut. Length over all, 115 mm.
Per pair, $ .35
Dozen lots, 10% discount

8-900. FORCEPS, Straight, Medium Points, nickel-plated. Length over all, 115 mm.
Per pair, $ .20
Dozen lots, 10% discount

10-280. FORCEPS, Straight, Student; made of steel, with dull nickel finish. These forceps are used in school work for handling phosphorus, potassium, etc. Length over all, 125 mm.
Per pair, $ .18
Dozen lots, 10% discount
Hundred lots, 15% discount



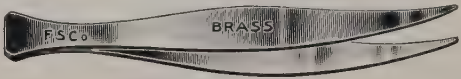
10-285



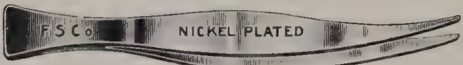
10-290

10-285. FORCEPS, Straight, Platinum Tipped, made of nickel-plated steel, highly polished, with corrugated handles. The tips are of heavy platinum and are riveted to the ends of the steel forceps. The platinum weighs approximately 1½ grams. Length over all, 165 mm. The price of the forceps varies according to the current price of platinum.
Price upon application

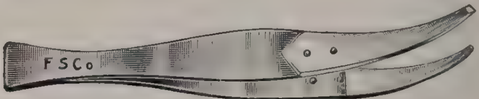
10-290. FORCEPS, Double, French Form, Platinum Tipped; made of nickel-plated steel, highly polished, with corrugated handles. One end is self-closing, with platinum tips. The other end is self-opening without platinum tips. The platinum weighs approximately 1½ grams; length over all, 145 mm. The price of the forceps varies according to the current price of platinum.
Price upon application



2-345



2-350

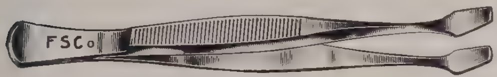


2-355

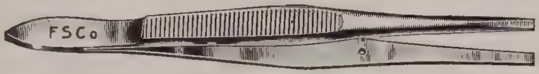
2-345. FORCEPS, Balance Weight, Brass Lacquered; curved shape, with rounded ends; for handling small weights and other small laboratory articles. Length over all, 90 mm.
Per pair, $ .20
Dozen lots, 10% discount

2-350. FORCEPS, Balance Weight, Nickel-plated; similar to No. 2-345, except that these forceps are nickel-plated. Length over all, 90 mm.
Per pair, $ .30
Dozen lots, 10% discount

2-355. FORCEPS, Balance Weight, Ivory Tipped; made of lacquered brass, with long ivory tips. These forceps are recommended for handling high-grade analytical weights and other delicate laboratory articles. The ivory tips do not scratch. Length over all, 95 mm.
Per pair, $ .90
Dozen lots, 10% discount



10-295

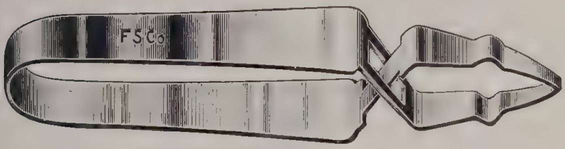


10-300

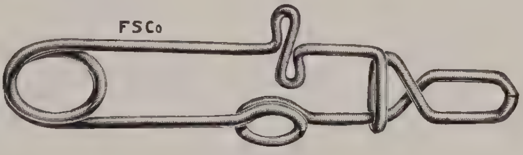
FORCEPS, Bone Cutting. See Dissecting Shears No. 8-990.

10-295. FORCEPS, Cover Glass, Bent Tips; made of nickel-plated steel, highly polished, with corrugated handles. The broad, thin tips are bent at the proper angle so that the microscope cover glass can be conveniently immersed in a shallow preparation dish. Length over all, 100 mm. **Per pair, $1.00**
Dozen lots, 10% discount

10-300. FORCEPS, Cover Glass, Straight Tips; of nickel-plated steel, highly polished. The handles are corrugated and made with a guide pin. The tips are broad and thin, convenient for picking up microscope cover glasses. Length over all, 110 mm. **Per pair, $ .70**
Dozen lots, 10% discount



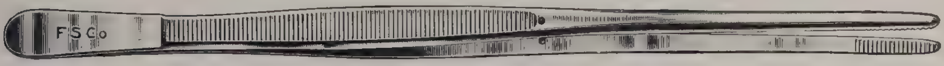
10-305



10-310

10-305. FORCEPS, Cover Glass, Cornet, Self-closing; made of one piece of nickel-plated spring brass. Only a small surface of the microscope cover glass is touched by these forceps. The handles are broad so that the forceps, while holding the cover glass, can be laid on the table without falling over and contaminating the cover glass. Length over all, 115 mm. **Per pair, $ .60**
Dozen lots, 10% discount

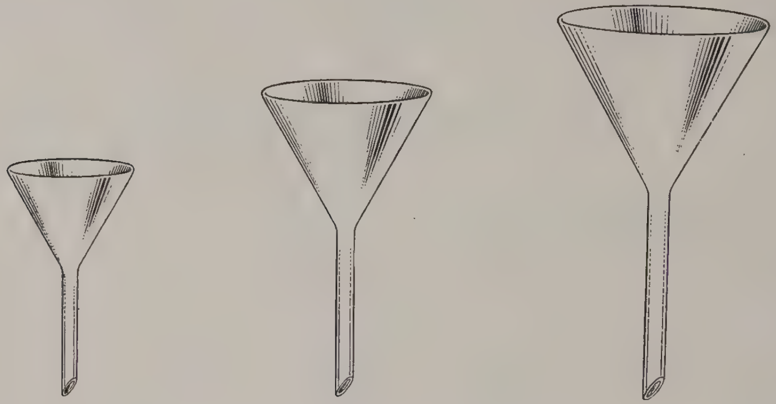
10-310. FORCEPS, Cover Glass, Stewart, Self-closing; made of one piece of nickel-plated spring wire, with two finger grips. One finger grip is designed so that the forceps can be laid on the table, while holding the microscope cover glass, without falling over and contaminating the cover glass. This design has an integral guide loop which allows free action of the jaws and prevents the tips from getting out of alignment. This style is used largely by students. Length over all, 110 mm. **Per pair, $ .20**
Dozen lots, 10% discount
Hundred lots, 15% discount



10-315

10-315. FORCEPS, Specimen Jar, Very Long; made of nickel-plated steel, highly polished. The handles are corrugated and made with a guide pin. The tips are carefully rounded and deeply file-cut on the inside. These forceps are specially adapted for removing specimens from deep jars or bottles and for other uses where very long forceps are desired. Length over all, 250 mm. **Per pair, $1.75**

FUNNELS

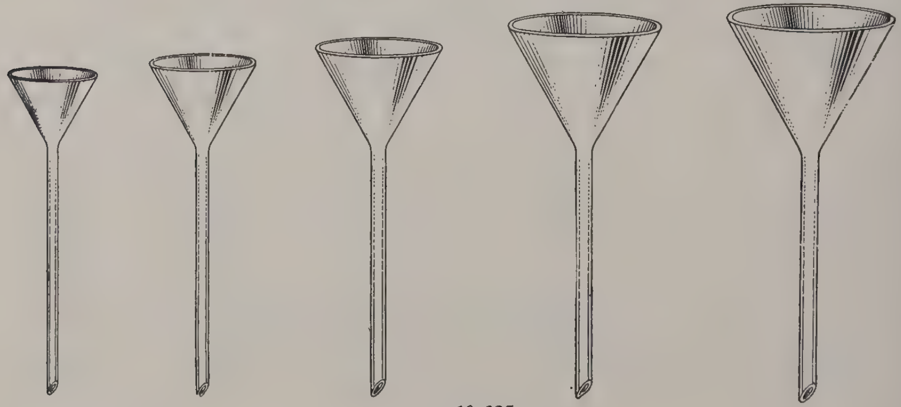


10-320

10-320. FUNNELS, Chemical, Glass; stems ground to a point, with lengths of stems according to recently adopted standards. The angle is made for 60°, although not guaranteed to be exact. In addition to filling purposes, these funnels may also be used for qualitative and students' filtration work.

*Diameter, mm	40	50	65	75	90	100
Length of stem, mm	50	60	65	75	90	100
Each	**$ .20**	**.22**	**.26**	**.32**	**.36**	**.40**
Dozen lots of a size, 10% discount						

*Diameter, mm	125	150	200	250	300
Length of stem, mm	125	150	150	150	150
Each	**$ .53**	**.67**	**1.05**	**2.00**	**2.65**
Dozen lots of a size, 10% discount					



10-325
See also No. 10-327

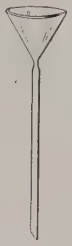
10-325. FUNNELS, Bunsen Filtering, Mold-blown Glass, with exact 60° angle and long, thin stems, which are ground to a point and of such diameter as to induce rapid filtration. All of these funnels are blown in molds, which fact accounts for their uniformity. The rims of these funnels are ground true.

*Diameter, mm	40	50	65	75	90	100
Length of stem, mm	150	150	150	150	150	150
Each	**$ .25**	**.27**	**.34**	**.38**	**.42**	**.50**
Dozen lots of a size, 10% discount						

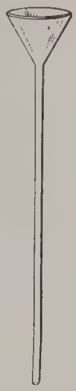
10-327. FUNNELS, Student Filtering, Glass. These filtering funnels are made with slender stems, 150 mm. long, ground to a point. The rims are ground flat. The angle is made for 60° and is quite uniform, but is not guaranteed to be exact in every funnel. These are the funnels usually specified by educational institutions.

Diameter	50	65	75	100
Each	**$. 22**	**.28**	**.32**	**.40**
Dozen lots of a size, 10% discount				

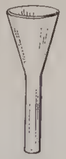
**Sizes recommended by the American Chemical Society, Standardization Committee.*



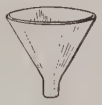
10-330



10-335



10-340



10-345

10-330. FUNNELS, Filtering, Constricted Neck, glass, exact 60° angle, with ground rims and long thin stems, ground to a point. Some laboratories prefer funnels with constricted necks for rapid filtering.

Diameter, mm.	65	75
Length of stem, mm.	150	150
Each	**$ .45**	**.50**

Dozen lots, of a size, 10% discount

10-335. FUNNEL, Sulphur Determination, Mold-blown Glass; diameter, 65 mm.; **angle exactly 60°**; rim ground; stem 300 mm. long and of heavy glass, 8 mm. outside diameter. All of these funnels are blown in a mold which accounts for their uniformity. This funnel is the one generally used in routine filtrations in steel laboratories for Determination of Sulphur. It should not be confused with the ordinary funnel tube of this style. **Each, $ .50**

Dozen lots, 10% discount

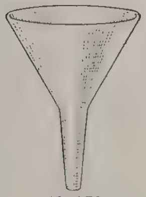
10-340. FUNNEL, Burette Filler, glass; diameter, 25 mm.; length of stem, 40 mm.; length over all, 65 mm. This funnel provides a convenient means of filling burettes up to 100 ml. capacity. **Each, $ .25**

Dozen lots, 10% discount

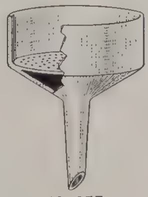
10-345. FUNNELS, so-called **Powder Funnels;** with smooth rims, short wide stems, ground square, for use with dry chemicals or viscous liquids.

Diameter, mm.	60	80	100
Diameter of stem, mm.	14	16	18
Each	**$ .25**	**.30**	**.40**

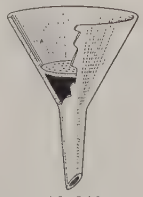
Dozen lots, of a size,10% discount



10-350



10-355



10-360

10-350. FUNNEL, Porcelain; diameter, 125 mm.; length of stem, 80 mm. This funnel is glazed inside and outside, except the rim, and is quickly and easily cleaned. **Each, $ .90**

10-355. FUNNELS, Buechner Filtering, porcelain; with straight sides and large perforated filtering plates, all made in one piece. The funnels are glazed inside and outside, except the rim, and are made so that standard sized filter papers will lie flat on the filter plates, and cover the perforated areas. Porcelain, on account of the nature of the material and the high firing, cannot be made to exact dimensions; there is a small variation in the dimensions given.

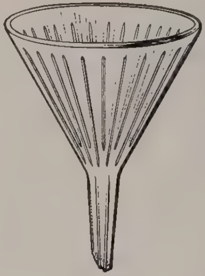
Outside diameter, mm.	80	110	130	160	200
Each	**$1.00**	**1.40**	**1.75**	**3.00**	**3.90**

10-360. FUNNELS, Hirsch Filtering, porcelain; with fixed, perforated filtering plates, glazed inside and outside, except the rim.

Diameter of top, mm.	75	92
Diameter, plate, mm.	28	28
Length of stem, mm.	41	52
Each	**$ .55**	**.65**

10-365

10-370



10-380

10-365. FUNNELS, Agateware, with handle; enameled inside and outside.

Diameter, mm.	115	145	185	225
Flowing capacity, ml	500	1000	2000	4000
Each	**$ .80**	**.90**	**1.15**	**1.40**

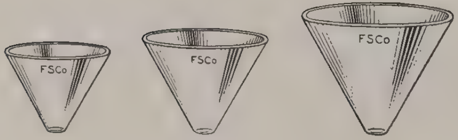
10-370. FUNNELS, Hard Rubber; for dispensing hydrofluoric and other acids. The stems are ribbed to allow the escape of air when filling bottles, etc.

*Diameter, mm.	80	110	125	150
Length of stem, mm.	20	35	45	65
Actual capacity, ml	100	250	400	650
Each	**$ .90**	**1.40**	**1.65**	**1.90**

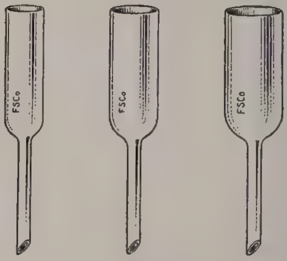
10-380. FUNNELS, Ribbed, heavy glass; with smooth rims and stems ground to a point. The ribs on the inside of the funnel tend to hold the filter paper away from the glass and lessen the time of filtration. The ribs on the outside of the stems allow the air to escape when the funnels are inserted in the necks of bottles.

*Diameter, mm.	95	120	145	180	220	255	325
Capacity, ml	125	250	500	1000	2000	4000	8000
Each	**$ .25**	**.30**	**.45**	**.75**	**1.00**	**1.60**	**3.00**

Dozen lots, 10% discount.



10-385



8-260

10-385. FUNNELS, Stemless, Sugar, exact 60° angle; with ground rims; used in sugar analysis.

*Diameter, mm.	75	90	100
Each	**$ .38**	**.42**	**.48**

Dozen lots, 10% discount.

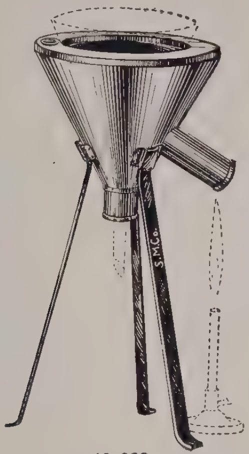
8-260. FUNNELS, Carbon Filter Tubes, heavy lamp-blown glass, with all stems 75 mm. long, 8 mm. outside diameter and ground to a point. These funnels are made to fit the various kinds of Gooch and Alundum Filtering Crucibles (see Crucibles), with which air-tight connections are made for suction filtration, by means of Gooch Rubber Tubing. The prices below are for the glass funnels alone, without crucibles or rubber tubing.

Inside diameter at top, mm	25	32	38
Length of body, mm.	75	75	75
Length over all, mm.	150	150	150
Each	**$ .35**	**.45**	**.60**

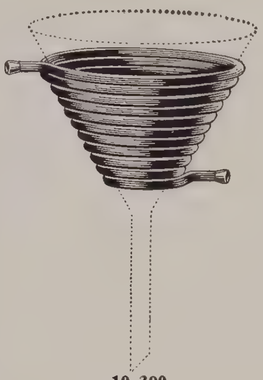
Dozen lots, 10% discount.

FUNNELS, for use with Filtering Crucibles, see page 274.

**Sizes recommended by the American Chemical Society, Standardization Committee.*



10-388

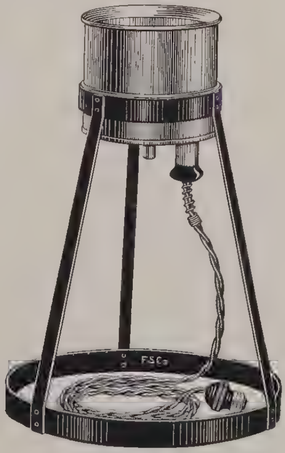


10-390

10-388. FUNNEL HEATER, Koch, double-walled, with detachable iron legs. Both walls are made of polished copper and designed to fit any 60° funnel, which may be kept at fairly uniform temperatures for hot filtrations. After filling the space between the walls with water, and replacing the screw cap, the temperature is maintained by allowing the flame of a burner to strike the handle-like projection. The water heated at this point is forced into circulation. At the top, the outside diameter is 175 mm. and the inside diameter 130 mm.; height over all, about 375 mm. Furnished without funnel or burner.
Each, $7.50

10-390. FUNNEL HEATER, Copper Coil; made of ten (10) coils of copper tubing, 10 mm. outside diameter, with brass nipples at the ends for attaching rubber tubing. The inside diameter of the heater is about 145 mm. at the top and 58 mm. at the bottom. This heater can be used with any standard funnel, because the coils have been wrapped on a 60° cone. For hot filtrations, hot water or steam is forced through the coils, making it well adapted for heating inflammable liquids, because an open flame need not be near. For cold filtrations, cold or ice water may be used successfully. **Each, $8.25**

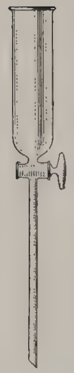
ELECTRICALLY
HEATED
FILTER FUNNEL



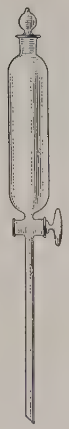
10-395

10-395. FUNNEL, Electrically Heated, for the rapid filtration of culture media. This funnel permits of rapid filtration of bacterial culture media by keeping the entire media warm. The funnel cone is removable, and is constructed of one (1) piece of aluminum, making it sanitary and dustproof. Ample air space has been provided between the funnel walls and the heating element to prevent over-heating. This is an advantage over the direct flame funnels, particularly when materials such as cotton are used for the filter. The heating elements are so distributed that the nipple of the funnel is also kept warm, thus preventing its choking. While this funnel is designed primarily for culture media filtration, it will serve as a general hot funnel for general laboratory purposes. Capacity, 1 quart; width at top, 7 inches; operates on 110 volt (4 amperes) A.C. or D.C. Height over all, 18 inches. **Each, $22.50**

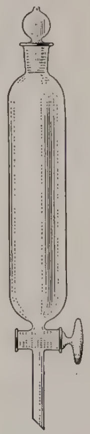
SEPARATORY FUNNELS



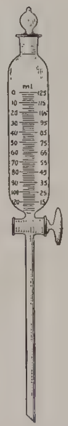
10-400



10-405



10-410



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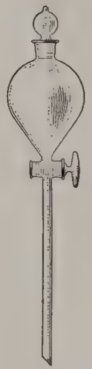
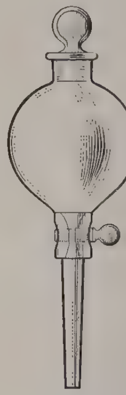


10-420



10-425

10-400. FUNNELS, Separatory, Cylindrical, Open Top; with glass stopcocks and long stems, ground to a point. The total capacities are about 20% greater than the rated capacities given below.

*Capacity, ml	60	125
Diameter, approx., mm	30	40
Each	**$1.30**	**1.45**

Dozen lots of a size, 10% discount.

10-405. FUNNELS, Separatory, Cylindrical, Glass Stoppered; with glass stopcocks and long stems, ground to a point. The total capacities are about 20% greater than the rated capacities given below.

*Capacity, ml	60	125	250
Diameter, approx., mm	30	40	50
Each	**$1.40**	**1.55**	**2.00**

Dozen lots of a size, 10% discount.

10-410. FUNNEL, Separatory, Cylindrical, Glass Stoppered, short stem, ground to a point, with glass stopcock; rated capacity, 500 ml. (total capacity about 20% greater); diameter, approximately 65 mm.

Each, $2.25

10-415. FUNNELS, Separatory, Cylindrical, Graduated; with glass stoppers, glass stopcocks and long stems, ground to a point. The graduations are numbered to be read both up and down.

*Graduated to, ml	125	250
Smallest subdivision, ml	1	5
Each	**$2.60**	**3.20**

10-420. FUNNELS, Separatory, Globe-shaped; with glass stoppers, glass stopcocks and long stems, ground to a point. The total capacities are about 20% greater than the rated capacities given below.

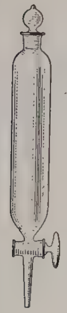
*Capacity, ml	30	60	125	250	500	1000
Each	**$1.35**	**1.45**	**1.55**	**2.00**	**2.25**	**2.65**

Dozen lots of a size, 10% discount.

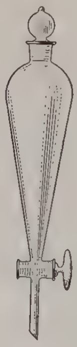
10-425. FUNNELS, Separatory, Heavy Molded Glass; globe-shaped, with glass stoppers, glass stopcocks and very thick walled stems ground square at the ends. These funnels are used largely for acids. The total capacities are about 20% greater than the rated capacities given below.

*Capacity, ml	500	1000	2000	4000
Each	**$3.75**	**4.50**	**6.00**	**9.00**

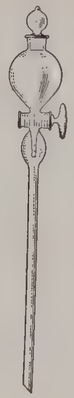
**Sizes recommended by the American Chemical Society, Standardization Committee.*



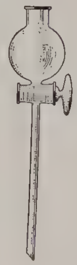
10-430



10-435



10-440



10-445

10-430. FUNNEL, Separatory, Nickel Determination, with glass stopper and glass stopcock; diameter, about 40 mm.; stem 55 mm. long and 2 mm. bore for holding a column of liquid. The actual capacity to the base of the neck is slightly over 160 ml.; used in iron and steel laboratories for separation of ether in Nickel Determinations. See *Blair's "Analysis of Iron and Steel," 8th edition, page 178.* **Each, $2.25**

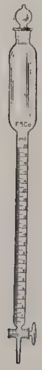
10-435. FUNNELS, Separatory, Squibb, Pear-shaped; with glass stoppers, glass stopcocks and short stems ground to a point. The actual capacities are about 20% greater than the rated capacities given below.

*Capacity, ml	125	250	500
Each	**$1.55**	**2.00**	**2.25**

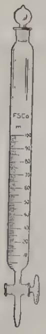
Dozen lots of a size, 10% discount

10-440. FUNNEL, Dropping-Separatory, Walter, with special device for delivering single drops; made with glass stopper, glass stopcock and stem, ground to a point. Diameter of larger bulb, 50 mm.; capacity, about 60 ml.; length of stem below stopcock, 275 mm. **Each, $2.25**

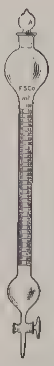
10-445. FUNNEL, Separatory, Johnson, with 4 mm. bore stopcock; used in routine work in steel laboratories. The bulb is 55 mm. in diameter and holds about 70 ml. to the base of the neck. The whole funnel is made of extra heavy glass including the stem, which is 165 mm. long below the stopcock. **Each, $2.50**



1-627



1-695



1-700

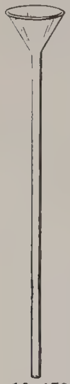
1-627. FUNNEL, Separatory, Barrett Design; used as a convenient receiver for Dehydrating Apparatus No. 1-585 in the process of dehydrating tar and other bituminous materials. Capacity, about 120 ml., the first 20 ml. of which is accurately graduated in 0.1 ml. Described in A.S.T.M. Standards 1924, *Method of Test for Water in Bituminous Materials, No. D-114-21-T.* With this funnel, one is able to measure the water, then withdraw it and retain the oil. **Each, $4.00**

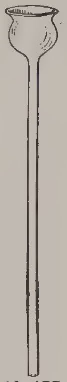
1-695. FUNNEL, Separatory, Tar-Acid, Barrett No. 1; for testing tar-acid in creosote oils, etc., where the tar-acid content is 25% or more. Capacity of funnel is about 200 ml.; graduated from the stopcock to 100 ml. in 1 ml. divisions. Made with special stopcock of large size and bore. For method, see *Jour. Ind. & Eng. Chem., X 911 (November, 1918).* **Each, $4.50**

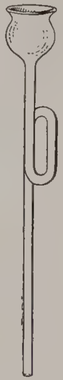
1-700. FUNNEL, Separatory, Tar-Acid, Barrett No. 2; for testing tar-acid in creosote oils, etc., where the tar-acid content is less than 25%. If the quantity being distilled is less than 65 ml., naphtha is added to bring the volume up to the 65 ml. mark on the graduated portion of the funnel. The lower bulb, up to the first graduated mark, holds exactly 65 ml., and from there to 100 ml. the divisions are in ⅕ ml. Made with special stopcock of large size and bore. For method, see *Jour. Ind. & Eng. Chem., X, 911, (November, 1918).* **Each, $5.25**

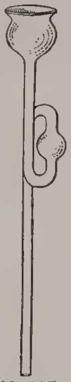
**Sizes recommended by the American Chemical Society, Standardization Committee.*

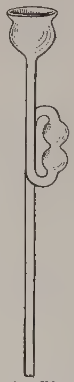
Funnel Tubes

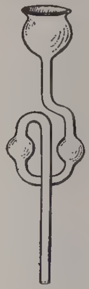

10-450


10-455


10-460


10-465


10-470


10-475

10-450. FUNNEL TUBE, Conical Top; diameter, 50 mm.; length of stem, 300 mm.; diameter of stem, 6 to 7 mm., to fit regular holes in rubber stoppers. **Each, $ .18**
Dozen lots, 10% discount. **Hundred lots,** 20% discount

10-455. FUNNEL TUBE, Thistle Top; diameter, 45 mm.; diameter of stem, 6 to 7 mm., to fit regular holes in rubber stoppers.

Length of stem, mm.	300	400
Each	$ .18	.20

Dozen lots, 10% discount. **Hundred lots,** 20% discount

10-460. FUNNEL TUBE, Thistle Top, with loop-trap; diameter of top, 45 mm.; length of stem below top, 300 mm.; diameter of stem, 6 to 7 mm., to fit regular holes in rubber stoppers. **Each, $ .25**
Dozen lots, 10% discount. **Hundred lots,** 20% discount

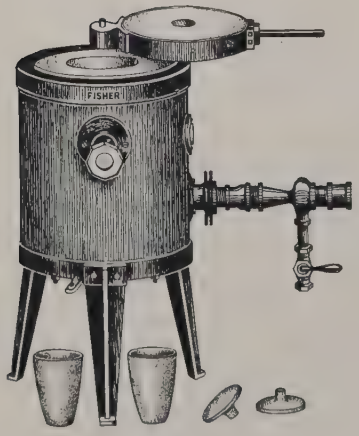
10-465. FUNNEL TUBE, Thistle Top, with bulb in loop-trap; diameter of top, 45 mm.; length of stem below top, 300 mm.; diameter of stem, 6 to 7 mm., to fit regular holes in rubber stoppers. **Each, $ .35**
Dozen lots, 10% discount

10-470. FUNNEL TUBE, Thistle Top, with two bulbs in loop-trap; diameter of top, 45 mm.; length of stem below top, 300 mm.; diameter of stem, 6 to 7 mm., to fit regular holes in rubber stoppers. **Each, $ .40**
Dozen lots, 10% discount

10-475. FUNNEL TUBE, Thistle Top, heavy glass, for use with Kipp Generators and other gas generators; diameter of top, 45 mm.; length of stem below top, 200 mm.; made with two bulbs in loop-trap, one bulb on either side of the central stem. **Each, $ .45**
Dozen lots, 10% discount

FUNNEL SUPPORTS, see Supports, page 539.

FURNACES

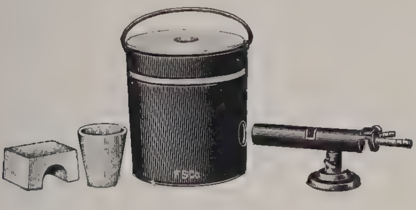


10-478

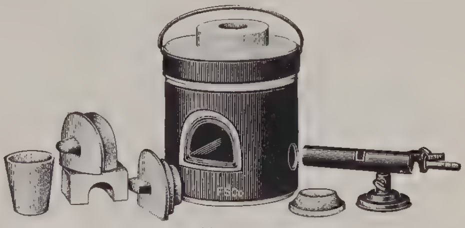
10-478 FURNACE, High Temperature, Melting, Gas Fired; for the determination of the fusion point of coal ash, clays, ores, etc., and for melting metals. This furnace is the same as the Coal Ash Fusion Point Furnace described on page 221. For determining the fusion points of clays, etc., the furnace is used in the manner described on page 221. For melting metals, however, the hole in the bottom tile of the furnace is luted with fire clay, and a suitable crucible inserted directly upon this tile. When the metal has become fluid, the lute is dropped from the tile, by sliding the false bottom below the tile, to one side, and puncturing or breaking the crucible. The molten metal can then be run through the hole into a mold placed beneath the furnace. This furnace can be used for temperatures up to 3000° F. and has a readily replaceable lining. An observation tube is provided for measuring the temperature with an F. & F. Optical Pyrometer, or a platinum thermocouple can be inserted in the opening above the burner.

The burner permits very accurate control of the gas and the compressed air; a reducing or an oxidizing atmosphere can be obtained. As most laboratories have compressed air, a blower is not included with the furnace but can be supplied to order, if desired. To operate at maximum capacity, 70 cu. ft. of air per minute is required.

High Temperature Melting Furnace as described, with burner, two crucibles and covers. **Each, $110.00**



10-480



10-485

10-480. FURNACE, Crucible, Gas Heated. This furnace is designed for melting metals, ores, etc., encountered in routine testing in metallurgy, chemistry, jewelry, etc. It is constructed on the air-gas injector principle and may be operated on illuminating gas, natural gas, or gasoline gas. The necessary air for the burner can be obtained directly from a compressed air line, a mechanical blower, or a footblower.

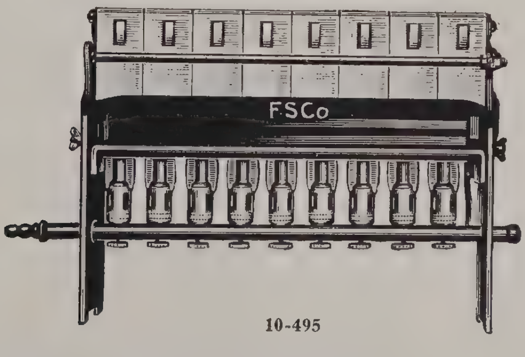
This furnace is 9 inches in diameter by 10 inches high, and has a fire box 4¾ inches in diameter by 5½ inches deep. The fire box is made of high temperature fire clay bound with iron. This furnace has a maximum gas consumption of 60 cu. ft. of gas per hour, melting about 6 lb. of metal. Weight of furnace, about 30 lb. Furnace is supplied complete with burner and one fire-clay crucible 4 inches high by 3½ inches diameter. **Each, $16.00**

10-485. FURNACE, Crucible and Muffle Combined, Gas Heated. This furnace is similar to the No. 10–480 Crucible Furnace, but is slightly larger and is made for use with a muffle, so that the furnace can be used as either a crucible or as a muffle furnace. Another feature of this furnace is found in the cover, which has a projection on one side so that by placing the cover on the furnace with this side down, a small 6 lb. crucible can be accommodated, while with the other side down, a 12 lb. crucible can be used. This furnace consumes a maximum of 100 cu. ft. of gas per hour; can be operated on either natural or artificial gas, and will melt about 12 lb. of metal.

It is 9½ inches in diameter by 11 inches high, and has a fire box 6 inches in diameter by 6½ inches high. Weight of furnace, about 35 lb. Furnace complete with burner, one (1) plumbago muffle 6x4x3½ inches outside, and one (1) fire-clay crucible 4 inches high by 3½ inches diameter. **Each, $29.00**

10-490. MUFFLE, Plumbago; for No. 10-485 Furnace. This muffle is made of plumbago; is 6 inches long 4 inches wide and 3½ inches high, and is closed at one end. **Each, $2.50**

CRUCIBLES, for use with No. 10–485 Furnace, see No. 8–155, 88x100 mm.



10-495

10-495. FURNACE, Tube, Fisher, Gas Heated; for the ultimate analysis of organic substances, distillation and coking of coal, oxidations, reductions, etc. This furnace is built along the lines of the Glaser furnace, but has nine (9) Fisher high temperature burners instead of the ordinary Bunsen burners. These burners will give much higher temperatures than the Bunsen burners, thereby enabling combustions to be made, which could not be made with the old type furnace because of the high ignition point of the material to be analyzed. The furnace is about 22 inches long and is fitted with clay tiles which enable the operator to observe the reactions, and at the same time serve as a muffle over the combustion tube.

Each burner can be regulated for both air and gas supply so that the temperature of each section of the combustion tube can be controlled. A nickel trough for supporting the tube displaces the low melting-point iron trough formerly supplied. This furnace is supplied with a removable reducing bushing so that the furnace can be supplied with gas from a rubber hose, or directly connected to the gas line of the laboratory. Furnace, complete with tiles and nickel trough. **Each, $80.00**

10-500. TILES, for No. 10-495 Fisher Furnace; for replacement................................**Each, $ .40**

ELECTRIC FURNACES

10-505

HOSKINS ELECTRIC FURNACES

10-505. FURNACE, Crucible and Muffle Combined, Hoskins Electric; for the melting or treating of relatively small quantities of material. This furnace can be used with a crucible or directly as a muffle. The heating unit is Chromel "A," coiled like a spring, which is wound around the refractory heating chamber, which has ridges to take the winding. The safe operating temperature is 1600° F. for continuous use, and 1800° F. for intermittent use. The furnace is placed on its side in the stand and a sheet-nickel floor inserted in this furnace. Crucibles will stand in the larger sized furnace when placed on its side without any floor plate. The temperature of the furnace must be controlled by means of the rheostat supplied with it. (See information "Regarding Heating Elements" at foot of this page.) Prices given are for furnaces for operation on 110 volt current. or for 220 volt current. **State voltage when ordering.**

Size No.	101	104
Heating chamber, inches	2x2½	5x5
Price, with rheostat	**$35.00**	**63.50**

10-508. HEATING UNITS for No. 10-505 Furnaces. Coiled units of Chromel "A" for winding on the outside of the heating chambers. For 110 volts or 220 volts. **State voltage when ordering.**

For furnace, size No.	101	104
Each	**$2.00**	**4.50**

REGARDING HEATING ELEMENTS

The Muffle, Crucible, and Tube Furnaces listed have heating elements of pure Chromel "A" which is 80% nickel and 20% chromium, and is practically iron-free. This is the original nichrome alloy, patented by the Hoskins Company, and has proved to be the most serviceable base-metal alloy for resistance units.

TO PROLONG THE LIFE OF A HEATING UNIT

The life of a heating unit is a matter of temperature and time, not time alone. Over-heating, for even a short time, takes more life out of a unit than a long run within the safe working temperature.

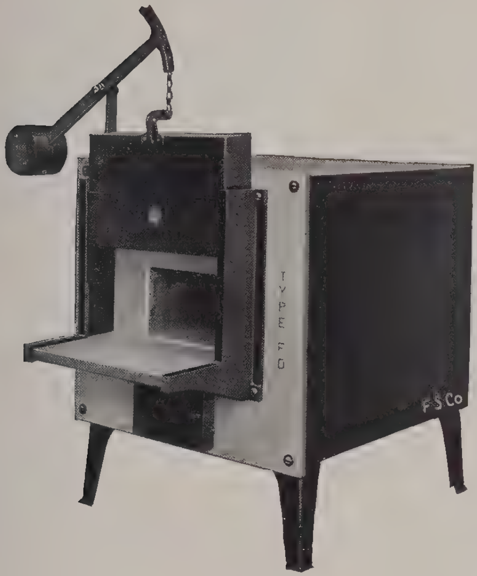
These furnaces are designed to come up to temperature in a reasonable time, and when the safe operating temperature is reached, resistance from the rheostat must be thrown into the circuit to prevent over-heating. Fluctuations in line voltages, unless compensated for, frequently cause over-heating.

Although Chromel "A" is the best base-metal alloy for resisting oxidation at high temperatures, oxidation does take place very slowly within the safe operating temperature but quite rapidly above this temperature.

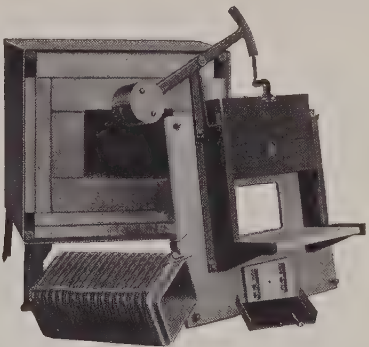
In replacing a heating unit, examine the refractory for spots which might have been fluxed by the old unit. Chip out such spots to prevent their fluxing the new unit.

FURNACES, Combustion Tube, Electric, see No. 7-465 and No. 7-485 on pages 247 and 248.

FURNACE, Fieldner, Electric; for the determination of the volatile matter in coal, see No. 6-695 under Coal Testing Apparatus, page 218.



10-510



No. 10-510 with front removed showing muffle wound with coiled heating unit

COILED HEATING UNITS

10-510. FURNACES, Muffle, Hoskins Electric. This furnace is used for the reduction, oxidation and sintering of ores, determination of ash content of organic substances like food, paint, and coal, or any other roasting or heat treatment where a number of samples are to be treated at high temperatures. These furnaces have a "one-piece" muffle wound externally with the heating unit in the form of a long spiral. The heating element is pure Chromel "A," which is 80% chromium and 20% nickel, and is practically iron-free. This alloy is a feature of this furnace.

Another feature is the simplicity of its design, which permits the ready renewal of either the heating unit or the muffle, by the operator, and also insures uniform temperature throughout the muffle.

Rheostats are supplied with these furnaces, and must be used in connection with them to prevent the temperature exceeding the safe operating temperature of 1600° F. for continuous use, or 1800° F. for intermittent use. (See information "Regarding Heating Elements" on page 364.)

A counterbalanced slide door, and a charging platform in front of the furnace and on a level with the floor of the muffle, are features which insure convenience in operation.

Prices given below are for furnaces for use on 110 volt current, or for 220 volt current. **State voltage when ordering.**

Size No.	201	202	203	204
Inside muffle, width inches	3	4½	5¼	7½
Inside muffle, height, inches	2½	3	3¾	5¼
Inside muffle, length, inches	7	10	12	14
Current consumption, full load, K.W	0.85	1.3	2.1	3.4
Each, with rheostat (*State voltage.*)	**$66.50**	**88.50**	**114.00**	**155.00**

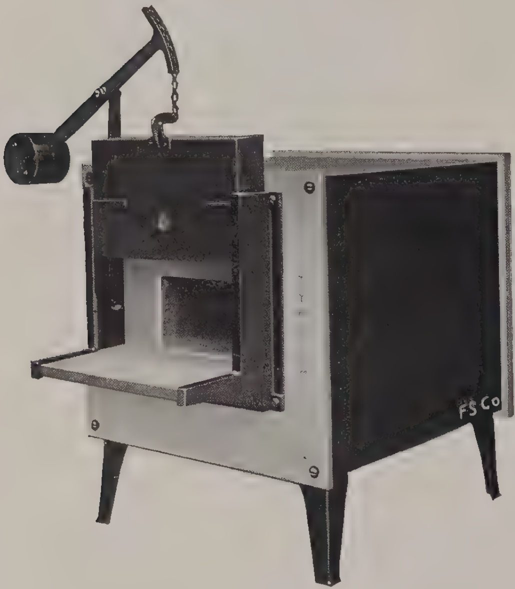
Furnaces for operation on voltages other than 110 or 220 will be quoted on request.

10-515. HEATING UNITS for No. 10-510 Muffle Furnaces. Made of pure Chromel "A," coiled like a spring, ready to be wound in the grooves around the outside of the muffle. Prices are for units for 110 volts, or for 220 volts. **State voltage when ordering.**

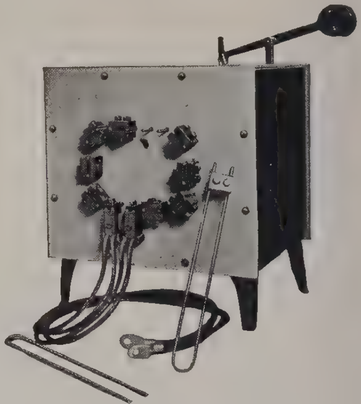
For furnace, size No.	201	202	203	204
Each (*State voltage.*)	**$3.75**	**7.00**	**11.00**	**17.00**

10-520. MUFFLES for Furnace No. 10-510. These muffles are made of a high temperature, heat-conducting refractory, and can be readily replaced in the furnace by the operator. The entire muffle is made in one piece with ridges to guide the winding; these ridges aid in placing the wire uniformly around the muffle and materially strengthen it. Muffle only without wire.

For furnace, size No.	201	202	203	204
Each	**$6.00**	**10.00**	**15.00**	**20.00**



10-525



Rear view of No. 10-525 showing hair-pin units removed

HAIR-PIN HEATING UNITS

10-525. FURNACES, Muffle, Hoskins Electric, Heavy Duty. These furnaces have been designed for heavy duty service; the general appearance is similar to that of the usual type furnace, No. 10–510, but the heating system is different.

One feature of this type furnace is the heavy heating units which better withstand the inevitable oxidation, and give longer life; they also increase the safe operating temperature to 1800° F. for continuous use, and 2000° F. for intermittent use. To employ these heavy units, lower voltages are necessary and transformers are supplied to reduce the usual line voltages (110 or 220 A.C.) to the particular voltage required by each furnace. **The line current must be alternating** because so great a reduction in voltage is not economical with direct current.

Another feature of this furnace is that the complete heating system is made up of a number of separate, heavy wires of Chromel "A," shaped in the form of "hairpins." The "hairpin" units are arranged so that any one of them can be readily withdrawn and a new one inserted without disturbing any of the other units. The muffle is a one-piece refractory which is readily replaced.

The temperature of the No. 202 size furnace is readily controlled by a rheostat inserted in the primary circuit (between the line and the transformer), and can be adjusted for any temperature from 600° F. to 2000° F.

The temperature of the No. 204 size is controlled by means of the switches on the switchboard supplied, and can be regulated for any temperature from that of the room, up to 2000° F. (See information "Regarding Heating Elements" on page 364.)

The prices given include the Furnace and the complete equipment, which is a Transformer and Rheostat for the No. 202 size, and a Regulating Transformer and Switchboard for the No. 204 size. **The current must be alternating; in ordering state whether 110 volt or 220 volt current is to be used, and also state the number of cycles.**

Size No.	202	204
Inside muffle, width, inches	4¼	7⅜
Inside muffle, height, inches	3	5
Inside muffle, length, inches	9	12½
Number of hairpin units	10	10
Current consumption, K.W.	2.8	6.0
A. For 60 cycle current (110 or 220 volt)	**$164.00**	**315.00**
B. For 25 cycle current (110 or 220 volt)	**$199.00**	**355.00**

(Prices for other currents quoted on request.)

10-530. HEATING UNITS for No. 10-525 Furnaces. Made of heavy Chromel "A," hairpin shape. For either 110 volt or for 220 volt current. **State voltage when ordering.**

For furnace, Size No.	202	204
Per unit	**$1.20**	**3.00**

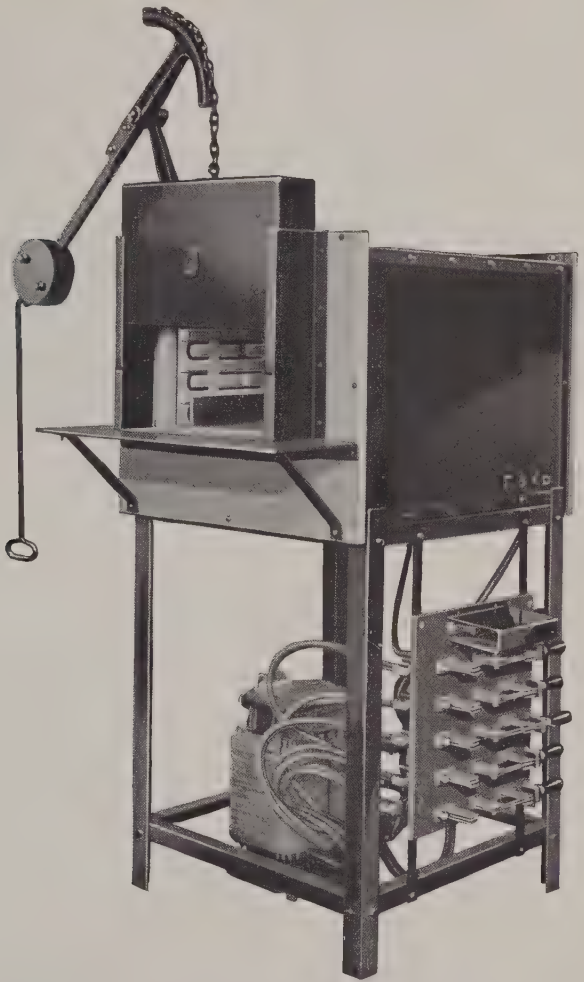
10-535. MUFFLES for No. 10-525 Furnaces; without heating units.

For furnace, Size No.	202	204
Each	**$6.00**	**12.00**

HOSKINS
HEAT TREATING FURNACE

Heavy Duty

HAIR-PIN HEATING UNITS



10-540

10-540. FURNACE, Heat-Treating, Hoskins Electric, Heavy Duty. This is a very popular heat-treating furnace because it supplies a clean and even heat; the heavy Chromel "A" "hairpin" units are very durable, and any one of them can be readily replaced.

It has no confining muffle; the heating space is formed by four (4) hard burned fire-clay slabs with places provided on the inner side for the "hairpin" units. A plate of nickel chromium alloy serves as a floor plate for the furnace and better withstands the wear than refractory material. The safe operating temperature is 2000° F. The furnace is mounted on a separate floorstand which brings the shelf to the convenient working height of 40 inches above the floor.

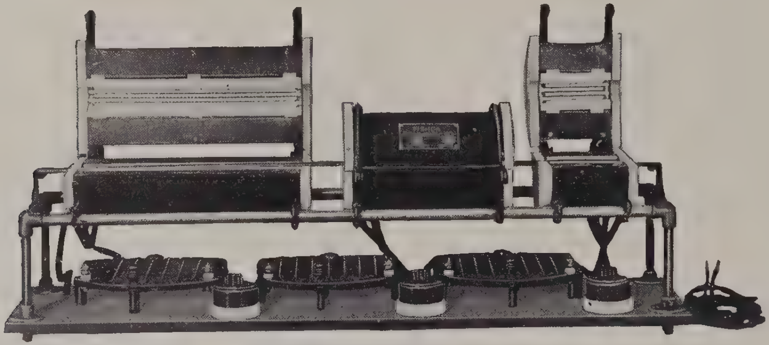
To use the heavy units, the current is reduced by a transformer, but the line current **must be alternating.** The temperature is controlled by switches on the switchboard supplied with the furnace. The heating chamber is 26 inches long by 12 inches wide by 8 inches high. It is heated by fourteen (14) hair-pin units and the current consumption is 20 K.W. **State voltage and the number of cycles when ordering.**

Furnace, Stand, Transformer and Switchboard. **A.** For 60 cycle current (110 or 220 volts), **$620.00**
B. For 25 cycle current (110 or 220 volts), **$710.00**

(Prices for other currents quoted on request.)

10-545. HEATING UNITS for No. 10-540 Furnace. Made of heavy Chromel "A," hairpin shape. For either 110 volt or for 220 volt current. **State voltage when ordering.** **Per unit, $5.50**

ELECTRIC ORGANIC COMBUSTION FURNACE



10-550

10-550. FURNACE, Organic Combustion, Electric; for the ultimate analysis of organic substances.

This furnace is built in three (3) split sections, mounted on rails and individually controlled for temperature by means of rheostats and switches. The upper part of each section is hinged so that it can be lifted and the progress of the combustion observed without disturbing the rest of the apparatus. The sections are 12, 8 and 4 inches long respectively, so that the temperature of the different sections of the tube can be individually controlled. Each section will reach a temperature of 1200° F. (650° C.) in about 15 minutes and 1800° F. (1000° C.) in 40 minutes. The furnace can be cooled to 600° F. in about 10 minutes by raising the upper section and shutting off the current.

The heating element is a coil of base-metal resistance wire mounted in grooves in the refractory. By removing a few screws, the refractory can be readily removed and a new element installed. The V-shaped trough for supporting the combustion tube is of pure nickel, which will withstand the high temperatures and oxidizing conditions of the furnace. This furnace can be operated continuously at 2000° F., and is designed for use on either 110 volt current or 220 volt current. **State voltage when ordering.**

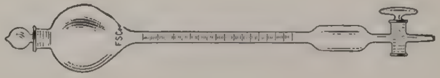
Outfit complete with three (3) Switches and three (3) Rheostats mounted on one base, without combustion tube. **Each, $200.00**

10-555. HEATING ELEMENTS; for No. 10-550 Furnace. In case of a burn-out in the heating elements in the furnace, a new element can be readily put in by the operator, thereby eliminating the need for shipping the furnace to the factory for rewinding. Each section of the furnace requires two (2) elements; usually only one (1) element requires replacement. Elements are for use on 110 volt, or for 220 volt current. **State voltage when ordering.**

Length of furnace section, inches	4	8	12
Per element (½ section)	**$1.50**	**2.00**	**2.25**

10-560. REFRACTORIES for No. 10-550 Furnace. The upper and the lower sections are the same.

Length of furnace section, inches	4	8	12
Each (½ section)	**$2.00**	**2.25**	**2.50**



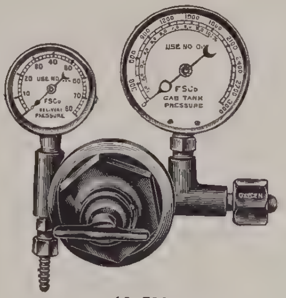
10-563

10-563. FUSEL OIL APPARATUS, Bromwell; for the determination of fusel oil in distilled liquors. The apparatus has a stopcock and a glass stopper, and is graduated from 20 ml. to 22 ml. in $\frac{1}{50}$ ml. divisions. Length over all about 425 mm.

The determination is made by first using 20 ml. of chloroform, 100 ml. of 30% fusel-free alcohol, and one (1) ml. of sulphuric acid; shaking and noting the increase in the chloroform volume. Then the same operation is performed with the unknown sample and the increase in the volume of chloroform due to the fusel oil, is noted. **Each, $4.50**

10-565

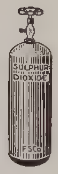
10-570



10-590
See also No. 10-595

10-575

10-580



10-585

10-565. GAS, Ammonia. In cylinders containing nine (9) pounds of gas. The cylinder is sold outright and can be refilled, **but is not returnable for credit.** **Cylinder** only, **Each, $8.00**
Gas, per lb., **$1.00**

10-570. GAS, Carbon Dioxide. In cylinders containing twenty (20) pounds of gas. The cylinder is sold outright and can be refilled, **but is not returnable for credit.** **Cylinder** only, **Each, $30.00**
Gas, per lb., **$ .25**

10-575. GAS, Oxygen, small cylinder. In cylinders containing forty (40) gallons of gas compressed to 1600 pounds pressure. These cylinders are small and very convenient for laboratory use. The cylinders are sold outright and can be refilled, **but are not returnable for credit.** **Cylinder** only, **Each, $6.00**
Gas, per 40 gal. charge, **$3.00**

Large tanks of oxygen under high pressure are not carried in stock, but can be obtained from the Linde Air Products Company.

10-580. YOKE AND KEY, for use with No. 10–575 Oxygen Cylinders, for connecting and regulating the flow of gas from the cylinder. **Each, $1.50**

10-585. GAS, Sulphur Dioxide, Liquified. In cylinders containing six (6) pounds. The cylinders are sold outright and can be refilled, **but are not returnable for credit.** **Cylinder** only. **Each, $3.50**
Gas, per 6 lb. charge, **$5.00**

10-590. GAS PRESSURE REGULATOR, for Oxygen, with Gauges. This regulator will fit the Linde Oxygen Cylinders and is supplied with two (2) gauges and a reducing valve. The larger gauge is calibrated to indicate the total pressure in pounds, within the cylinder. Two (2) auxiliary scales on the dial indicate the volume of residual gas in the cylinder in cubic feet of free gas. The one scale is used for cylinders of 100 cu. ft. capacity, and can be used for cylinders of 200 cu. ft. capacity by merely doubling the reading on the 100 ft. scale. The other scale is used for cylinders of 250 cu. ft. capacity.

The smaller gauge indicates the pressure of the oxygen after it has passed through the pressure regulating valve: i.e., the actual pressure at which the oxygen is being delivered.

The pressure reducing valve is of the "seated diaphragm" type and is not soldered, so that ruptured diaphragms can be readily replaced by any mechanic and the reducer put back into use immediately. The valve bonnet is perforated to release the oxygen should the diaphragm be ruptured.

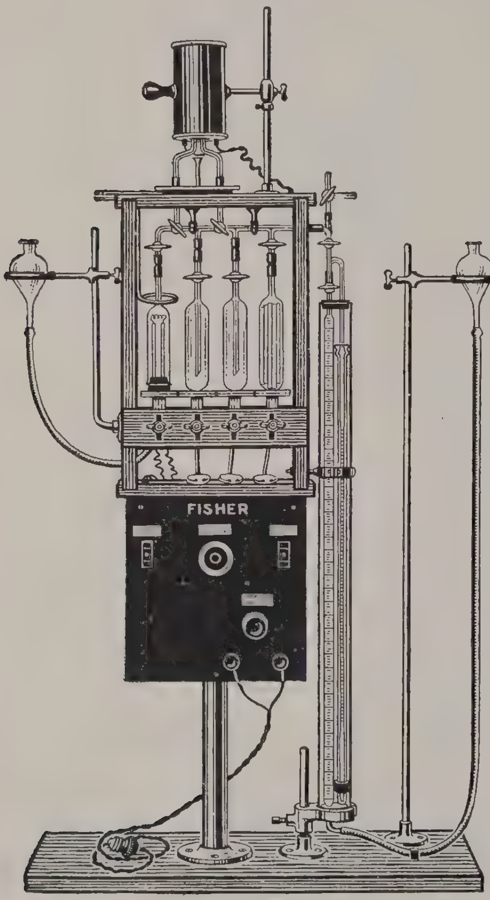
The diaphragms are designed to give maximum life to the regulator, and at the same time insure the safety of the operator.

NOTE: As the oxygen forms explosive compounds with oils and greases, no lubricant of any kind should be used on these gauges. No oil is necessary.

The threads on this reducer are designed to fit Linde Oxygen Cylinders only. This regulator should not be used on cylinders containing hydrogen, acetylene, or other gas which might form an explosive compound with the oxygen. **Each, $30.00**

10-595. GAS PRESSURE REGULATOR, for Oxygen, without Gauges. This regulator is the same as the No. 10 595 Pressure Regulator, but is supplied without the gauges to meet a demand for a regulator for use with gauges already at hand in the laboratory. **Each, $17.00**

GAS ANALYSIS APPARATUS



10-600

REGARDING GAS ANALYSIS APPARATUS

We make a specialty of Gas Analysis Apparatus, and being located in the center of an Industrial District and on the same street with the U. S. Bureau of Mines Gas Laboratory, our Chemists and Glass Blowers have had the benefit of personal contact with some of the best informed men on this subject.

To list even a small portion of the many different kinds of gas apparatus that we have made, would merely confuse the selection. After reviewing this apparatus and consulting some of the best authorities, we have designed and catalogued five (5) Fisher Standardized Types of Apparatus which cover the general field of gas analysis. Each apparatus conforms to the latest practice and fulfills the requirements for the determinations for which it is intended.

We have also catalogued and described additional pipettes, etc., which can be embodied in this apparatus so that it can be modified to suit any special requirements. If desired, we will suggest and manufacture different apparatus and modifications to meet any special need.

For further information concerning the technique of gas analysis, refer to:

WINKLER-CLEMENS — *"Handbook of Technical Gas Analysis."*

HEMPEL-WALTHER—*"Methods of Gas Analysis."*

TRAVERS—*"The Experimental Study of Gases."*

DENNIS—*"Handbook of Gas Analysis."*

U. S. BUREAU OF MINES—*Bulletins 19 and 42.*

U. S. STEEL CORP. — *"Methods of Sampling and Analysis of Gases."*

AMERICAN GAS ASSOCIATION — *"Gas Chemists' Handbook."*

UNIVERSITY OF ILLINOIS — *"Engineering Experimental Station, Circular 12."*

10-600. GAS ANALYZING APPARATUS, **Fisher Universal** (Type A). **Our standardized apparatus for the complete and precise analysis of:**

- Blast-furnace gas
- Blue-water gas
- Flue gas
- Illuminating gas
- Natural gas
- Producer gas
- Synthetic gaseous fuels
- Exhaust gases from internal combustion engines
- Commercial Oxygen
- Commercial Hydrogen
- Commercial Carbon Dioxide
- Commercial Hydrogen Sulphide
- Commercial Acetylene
- Commercial Ethylene

This one apparatus equips a laboratory for the complete and precise analysis of practically any kind of gas.

The apparatus consists of a precision gas measuring burette, with a Vilbrandt Temperature and Pressure Compensator, encased in a water-jacket for temperature control; two (2) bubbling pipettes, one (1) slow-burning pipette and one (1) plain absorption pipette; a copper-oxide-combustion tube and furnace for heating it; two (2) leveling bulbs, one (1) for the burette and one (1) for the slow-burning pipette, and a switchboard with complete electrical equipment. It is standardized throughout, and is built in our own Glass Blowing and Instrument Shops. (*For replace parts, see pages 376-378.*)

Burette. The burette is about 40 inches long, made without bulb, has a capacity of 100 ml. (with a 100 ml. sample, it reads directly in per cent), is calibrated from the bottom of the upper stopcock, and is graduated in 0.1 ml., but may be easily read to 0.05 ml. or 0.05%. It has two (2) three-way stopcocks at the upper end. The upper stopcock serves to connect the burette to the absorption system, also to the auxiliary three-way stopcock. The three-way stopcock connects with the source of supply of the gas to be analyzed, and also connects with a reservoir of nitrogen, hydrogen, or oxygen to be used as auxiliary gases in the analysis of gases where these are required. The lower stopcock serves to connect the burette with the pressure compensator. The burette is immersed in a water bath to insure a constant temperature of the gas while being measured. At the lower end it is connected to a leveling bulb by means of rubber tubing. The burette is held in position by a clamp which holds it to the pipette rack, and it rests on an adjustable metal support mounted on the baseboard.

FISHER UNIVERSAL GAS APPARATUS—Continued

Vilbrandt Compensator. Used in this apparatus by special permission of Dr. Frank C. Vilbrandt. This tube obviates the numerous calculations necessary to correct for temperature and pressure variations which occur in the course of the analysis. This compensator is quite an improvement on the old device which required a manometer suspended outside of the water-jacket.

The Vilbrandt Compensator consists of a long tube immersed in the water bath alongside the burette. Within this tube is sealed another tube with a bulb at its upper end; it is connected to the burette stopcock.

To read the volume of gas being measured under "standard" conditions, it is only necessary to vary the pressure on the gas system by raising or lowering the leveling bulb of the burette until the mercury in the compensator returns to a predetermined level. For further details of operation, see "*Journal of Industrial and Engineering Chemistry,*" *16, 936 (September 1924).*

This method of compensating insures measuring the gas under the same pressure and temperature at all times. As the manometer is entirely enclosed in the water-jacket, it too, is maintained at constant temperature—while at the same time, it is out of harm's way and cannot be easily broken. With this compensator, the burette is placed very close to the absorption pipettes and thus saves at least six (6) inches of capillary space, and so reduces the "capillary error" of the apparatus.

Pipettes. There are three (3) absorption pipettes, one (1) plain, two (2) bubbling; and one (1) slow-burning pipette of the Haldane type. They are all of standardized design and are carried in stock. They are mounted on individual elevating platforms to facilitate refilling, and are fitted with rubber expansion bags for protecting the solutions from the atmosphere.

Plain Absorption Pipette. This is of the two (2) compartment type, and is filled with glass tubes to increase the absorption area. This is recommended for the absorption of carbon dioxide in caustic soda or caustic potash.

Bubbling Type Absorption Pipettes. These are also of the two (2) compartment type. The gas inlet tube, however, extends downward into the absorption chamber. The gases are thus caused to bubble up through the absorbing solution, effecting rapid and complete absorption, and causing the solution to circulate, thus insuring fresh solution coming into contact with incoming gas. A special high-vacuum, three-way stopcock permits the gas to enter the tube with one (1) setting, and with the other setting permits the residual gas to be completely withdrawn from both the pipette proper and the inlet tube at the same time. Experiments have shown that this is the most efficient type of absorption pipette for use with non-viscous absorbents, like cuprous chloride and alkaline pyrogallate, or with oleum which requires continual stirring.

Slow-Burning Pipette (Haldane Type), **Pyrex Glass.** In this type of pipette, the combustion is effected by means of an electrically heated spiral of platinum wire. The spiral is a separate unit suspended from two (2) platinum terminals, and may be readily replaced if burned out. The terminals are fused into glass tubes which extend downward, and through the rubber stopper. Copper leads are fused to the lower ends of the terminals and pass through the tubes, and are sealed to the ends with cement. Constrictions at the middle of the glass tubes prevent undue vibration of the wires. To replace a burned out combustion coil, it is only necessary to loosen the rubber stopper and withdraw the glass tubes, coil, etc., as a unit; a new coil can be installed and the apparatus put back into immediate use. Current for the platinum coil is obtained from any 110 volt A. C. lighting circuit of the laboratory. It is stepped down by means of the transformer and controlled by the rheostat, both of which are mounted on the switchboard. (See illustration on page 370.)

Pipette Cooler. A pipe, to be connected with a compressed air line in the laboratory, distributes the air in fine streams over the sides of the slow-burning pipette, and cools the gas preparatory to measuring its volume. This saves much time and insures greater accuracy.

Copper-Oxide Tube. This tube used to determine hydrogen and carbon monoxide, is mounted on the top of the pipette rack. The tube consists of a Pyrex container filled with specially prepared copper-oxide catalyst. The gases are burned by passing them over the catalyst, which is heated to 290–310° C. by means of the furnace. The hydrogen burns to water, and the carbon monoxide to carbon dioxide. These are then determined by measuring the amount of contraction, and the volume of carbon dioxide formed.

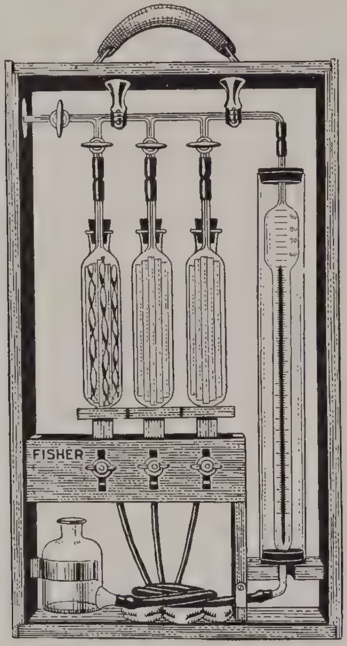
Electric Furnace. This is wound of a special base-metal-alloy resistance-wire, embedded in alundum cement. It is fitted with an insulating handle and adjustable clamp, so that it may be readily raised or lowered over the copper-oxide tube. Current for the heater is controlled by the rheostat on the switchboard. A thermometer is provided for checking the temperature; it is inserted in an opening in the top of the furnace.

Copper-Oxide-Tube Cooler. A cooling tube is attached to the top of the pipette rack. After the combustion has been completed, the furnace is raised from over the tube and a stream of compressed air is directed on the tube.

Manifold and Connections. The manifold is made of very heavy, capillary tubing with stopcocks tested to withstand a vacuum of 25 inches of mercury. The stopcocks for the copper-oxide tube are of special design; these permit the gases to be passed in any of three (3) different directions. This has materially decreased the length of the manifold and its capillary space, and so decreased the "capillary error" of the apparatus. The manifold is held by rubber-cushioned nickel-plated metal holders made in two pieces; the manifold is easily removed. All rubber connections are Scimatco Laboratory Tubing, which clings to the glass and prevents leaks.

Switchboard. All electrical controls are mounted on a single Bakelite switchboard at the base of the pipette rack. The snap switch at the left and the lower rheostat control the current flowing through the transformer and the Haldane pipette; the switch at the right and the upper rheostat control the current to the furnace. All equipment is designed according to Underwriters' Specifications; all wiring is extra heavy asbestos-covered, and so laid out that the entire electrical apparatus is operated directly from a single light socket by connecting the cord with plug, to any 110 volt A. C. line.

The Fisher Universal Gas Analyzer is a carefully designed unit; the workmanship throughout is in keeping with other high-class instruments which we manufacture. Complete, as described and illustrated, for use on 110 volt alternating current, without mercury or reagents; with directions, packed for shipment. **Each, $195.00**



10-605

FISHER
GAS APPARATUS

TYPE B
THREE PIPETTES

For Flue Gases

NOTE: *Sliding doors, not shown in the illustration, completely enclose the apparatus when not in use.*

10-605. GAS APPARATUS, Fisher, Type B, for Flue Gases, Three (3) Absorption Pipettes. Our standardized, simple gas apparatus which is compact and portable, with many features which add to its utility. Replace parts can always be obtained from our regular stock.

Uses. The three (3) most common constituents, $\mathbf{CO_2}$, **CO** and $\mathbf{O_2}$, are determined with this apparatus, and by using oleum instead of the oxygen absorbent, **illuminants** can also be determined. It is a most convenient apparatus for the analysis of flue gases from gas-fired, coal-fired, or oil-fired furnaces.

Pipettes. There are **three (3) plain absorption pipettes** of the two-compartment type; the front compartment is the absorbing compartment which is filled with glass tubes to increase the absorption area; the rear compartment is the reservoir for the solution. One (1) of the pipettes has twisted copper strips as well as the glass tubes, to maintain the cuprous condition of cuprous chloride solutions. Each pipette has a rubber expansion bag which protects the absorbent from the atmosphere. These pipettes are standardized and can be replaced from our stock.

Each pipette has a separate adjustable support held by a butterfly nut, which can be lowered when the pipette is to be removed. This feature facilitates operating and eliminates the difficulties and liability of breakage when pipettes are removed for refilling.

Burette. The burette has a capacity of 100 milliliters with a bulb on the top; the lower part of the burette is graduated from 0 to 50 ml. in $\frac{1}{10}$ ml. divisions, and can be read directly in per cent; graduated portion of the burette has a Schellbach blue-and-white glass back, which facilitates the reading. The burette has a water-jacket which completely surrounds it. Burettes are standardized and can be replaced from stock. A leveling bottle, with sufficient Scimatco Laboratory Tubing to connect it to the burette, is supplied.

Manifold. The glass manifold is one (1) piece of heavy capillary tubing with three (3) two-way stopcocks of small bore, and a three-way stopcock at the inlet. All stopcocks are designed especially for this use, and each one is tested under reduced pressure. The manifold is annealed, and being standardized, can be replaced from our stock. The manifold is held by special nickel-plated metal holders which have rubber cushions to protect the glass, and are made in two (2) pieces so that the manifold can be easily removed.

All connections are Scimatco Laboratory Tubing, which is jet-black, non-blooming, and clings to the glass and prevents leaks.

Case. The case is made of hardwood, is very substantial, and has front and rear doors which can be removed so that the entire apparatus is accessible. The doors are laminated to prevent warping. Case has a polished finish, and has a large leather handle similar to those used on traveling bags.

Each, without reagents, **$48.00**

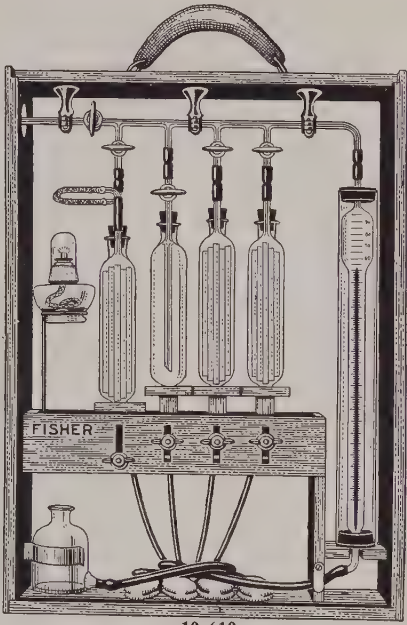
(For replace parts, see pages 376-379)

FISHER GAS APPARATUS

TYPE C
FOUR PIPETTES

With Palladium Tube

NOTE: Sliding doors, not shown in the illustration, completely enclose the apparatus when not in use.



10-610

10-610. GAS APPARATUS, Fisher, Type C, with Four (4) Pipettes and Palladium Tube. Our standardized, compact and portable apparatus with many convenient features for more complete work than can be done with the No. 10–605 Apparatus. (*For replace parts, see pages 376-379.*)

Uses. Five (5) of the most common determinations can be made with this apparatus, i.e., **CO_2, CO, O_2, H_2,** and **nitrogen** by difference. By using oleum instead of the oxygen absorbent, **illuminants** may also be determined.

It is used for the control analysis of flue gas, blue-water gas, producer gas (from anthracite or coke) and blast furnace gas.

Pipettes. There are **three (3) plain absorption** pipettes of the two-compartment type with glass tubes in the absorption compartment to increase the absorption area. Each pipette has a rubber expansion bag which protects the absorbents from the atmosphere. Each pipette has a separate adjustable support which can be lowered to remove the pipette for refilling.

A Bubbling Pipette is also included, which was designed to obtain a complete and rapid absorption of CO by cuprous chloride, by causing the gas to bubble through the solution. A special three-way stopcock at the top permits the gas to enter the bubbling tube with one (1) setting, and with another setting, permits the gas to be withdrawn from both the pipette and the bubbling tube at the same time; the stopcock is tested under reduced pressure. This type of pipette is recommended because cuprous chloride on account of its low viscosity, does not readily adhere to the tubes in the plain absorption pipette. This pipette also has a rubber expansion bag; it is standardized, and can be replaced from our stock.

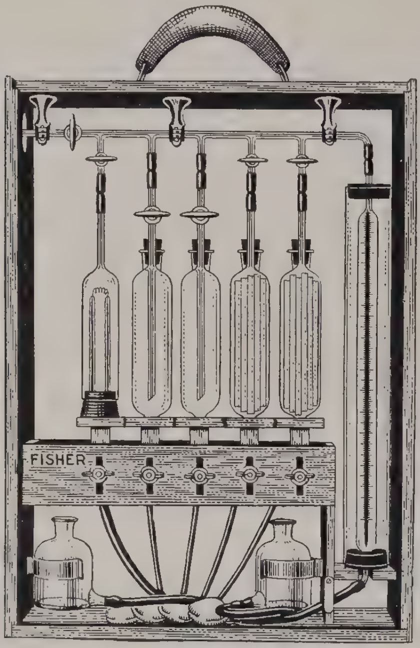
Palladium Tube. This tube is filled with a special palladium catalyst, and is connected to the top of the absorption pipette on the left. The pipette is used as a reservoir when the gas is passed through the palladium tube, or, if desired, the palladium tube can be removed, the pipette raised by means of its adjustable support, and used for absorption solutions.

It should be noted that in order to absorb hydrogen, the palladium should be heated to a temperature between 70° and 90° C. To accomplish this, a small alcohol lamp is provided, mounted on an adjustable support which may be raised or lowered. This method of determining H_2 is the usual one for portable apparatus; for precise work the method of burning over copper oxide as used in Precision Apparatus No. 10–600, is recommended.

Burette. The burette has a capacity of 100 milliliters, with a bulb at the top; the lower part of the burette is graduated from 0 to 50 ml. in $\frac{1}{10}$ ml. divisions, and can be read directly in per cent. The graduated portion has a Schellbach blue-and-white glass back, which facilitates the reading. The burette has a water-jacket which completely surrounds it. A leveling bottle and sufficient Scimatco Laboratory Tubing to connect it to the burette, are also supplied.

Manifold. The manifold is one (1) piece of heavy, capillary, glass tubing, with three (3) two-way stopcocks of small bore, an outlet for the bubbling pipette, and a three-way stopcock at the inlet. All stopcocks are designed especially for this use, and each one is tested under reduced pressure. The manifold is held by special nickel-plated metal holders, which have rubber cushions to protect the glass, and are made in two (2) pieces so that the manifold may be easily removed. This manifold can be replaced from our stock. All connections are Scimatco Laboratory Tubing which clings to the glass and prevents leaks.

Case. The case is made of hardwood, is very substantial, and has front and rear doors, which can be removed so that the entire apparatus is accessible. The doors are laminated to prevent warping. Case has a polished finish, and has a large, leather handle for carrying. **Each,** without reagents, **$65.00**

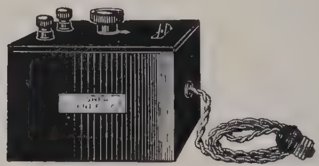


10-615

FISHER
GAS APPARATUS

TYPE D
FIVE PIPETTES

NOTE: Sliding doors, not shown in the illustration, completely enclose the apparatus when not in use.



10-620

10-615. GAS APPARATUS, Fisher, Type D, with Five (5) Pipettes; One (1) Slow-Burning and Four (4) Absorption. Our standardized apparatus for complete control work, in compact and portable form, with many features which facilitate its operation. (*For replace parts, see pages 376-379.*)

Uses. This apparatus has a broad application. It can be used to determine **CO_2, CO, O_2, H_2, illuminants, methane, ethane,** and **nitrogen** by difference. For routine work, the **B.T.U. Value** can be calculated with sufficient accuracy for control purposes.

It is used for the analysis of flue gas, blue-water gas, producer gas, blast furnace gas, by-product gas, oil gas, and gaseous fuels, with sufficient accuracy for control work.

Pipettes. There are four (4) absorption pipettes; two (2) of the plain, two-compartment type with glass tubes to increase absorption, and two (2) bubbling pipettes with three-way stopcocks, to obtain the complete and rapid absorption of CO by cuprous chloride, and O_2 by pyrogallol. The pipettes have rubber expansion bags to protect the absorbent. Each pipette has a separate adjustable support, which can be lowered to remove the pipette for refilling.

The Slow-Burning Pipette (Haldane Type) is made in two (2) parts; the **Pyrex** glass pipette, and the stopper with the protected lead wires with replaceable platinum wire coil. This method of slowly burning the hydrocarbons is recommended in preference to the explosion method, because it is more accurate and can be used with gases of concentrations below, equal to, or above the explosion range. To heat the platinum coil, requires about two (2) or three (3) amperes at six (6) volts, which may be derived from dry batteries, or from a 110 volt A.C. lighting circuit current, with No. 10–620 Transformer and Rheostat interposed.

Burette. The burette is the straight type with a capacity of 100 ml. graduated over its entire length in ⅕ ml. divisions; numbered up and down every 2 ml., and can be read directly in per cent. With this burette, any percentage of absorption can be measured; air, oxygen, or oxygen-nitrogen mixtures, which may be added to effect the combustion, can also be measured. This burette has a Schellbach blue-and-white glass back, which facilitates reading. It has a water-jacket, and is supplied with a leveling bottle and rubber tubing.

Manifold. The manifold is one (1) piece of heavy, capillary, glass tubing with three (3) two-way stopcocks, two (2) branches for bubbling pipettes, and a three-way stopcock of small bore. All stopcocks are designed for this use, and are tested under reduced pressure. This manifold is standardized, and can be replaced from stock. The manifold is held by special nickel-plated metal holders, which have rubber cushions to protect the glass, and are made in two (2) pieces so that the manifold can be easily removed.

Case. The case is made of hardwood, is very substantial, and has front and rear doors which can be removed, so that the entire apparatus is accessible. The doors are laminated to prevent warping. Case has a polished finish, and has a large leather handle for carrying.

Each, without transformer or reagents, **$75.00**

10-620. TRANSFORMER EQUIPMENT with Rheostat, for No. 10-615 Apparatus. A complete and convenient unit, designed for use with the Slow-Burning Pipette, on a 110 volt A.C. lighting circuit. Consists of a suitable transformer, and a rheostat for controlling the temperature of the ignition coil; mounted in a compact case with Bakelite switchboard top. The rheostat handle, a trip switch and two (2) binding posts on the top of the case, make the operation very convenient. A cord and plug is provided for attaching to the 110 volt A.C. lighting circuit. **Each, $22.00**

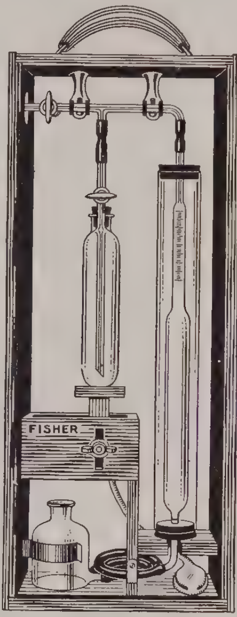
FISHER GAS APPARATUS

TYPE E

ONE BUBBLING PIPETTE

For Commercially Prepared Gases

> ***NOTE:*** *Sliding doors, not shown in the illustration, completely enclose the apparatus, when not in use.*



10-625

10-625. GAS APPARATUS, Fisher, Type E, with One (1) Bubbling Pipette. This is our Standardized Apparatus for determining the purity of commercially prepared gases, which are known to have a purity of more than 98%. It can be used to determine the purity of "cylinder" gases, such as:

- Acetylene
- Ammonia
- Carbon Dioxide
- Chlorine
- Ethylene
- Hydrogen
- Hydrogen Sulphide
- Oxygen
- Sulphur Dioxide

Pipette. The pipette is of the two-compartment, bubbling type with a three-way stopcock so designed that with one (1) setting the incoming gas is caused to bubble up through the absorbent, while with the other setting, the unabsorbed gas can be removed from both the bubbling tube and the pipette proper. This insures maximum contact area between the gas and absorbent; causes the absorbent to circulate, continually bringing fresh absorbent into contact with the incoming gas, and permits the withdrawal of the last traces of unabsorbed gas from the pipette.

Burette. The burette has a capacity of 100 ml.; the upper portion is graduated for 2 ml. in 0.05 ml. divisions, and can be easily estimated to 0.01 ml., permitting analyses to be made to .01%.

Manifold. The manifold is of heavy, capillary tubing with a branch for the bubbling pipette and a three-way tested stopcock of small bore at the inlet. It is standardized and can be replaced from stock. It is held by special nickel-plated metal holders which have rubber cushions to protect the glass, and are made in two (2) pieces so that the manifold can be easily removed.

All connections are Scimatco Laboratory Tubing, which clings to the glass and prevents leaks. All parts are standardized and may be supplied directly from stock.

Case is of hardwood, is very substantial, and has removable front and rear doors which make the entire apparatus accessible. The case has a polished finish, and has a large, leather handle for carrying. Supplied with directions for operating, but without reagents. **Each, $30.00**

(*For replacement parts, see pages 376-379.*)

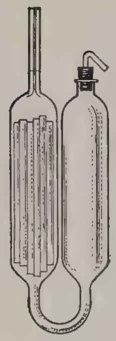
SPECIAL GAS APPARATUS

WILL BE MADE TO ORDER
IN OUR

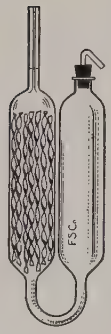
GLASS BLOWING SHOP

EXTRA PARTS FOR FISHER STANDARDIZED GAS APPARATUS

Different combinations of these parts can be embodied in the cases for one (1), three (3), four (4), or five (5) pipettes.



10-630



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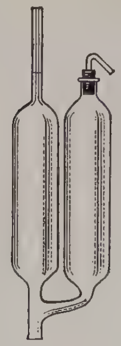

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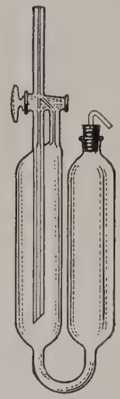

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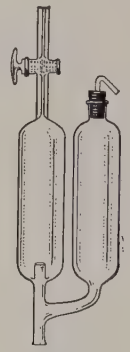

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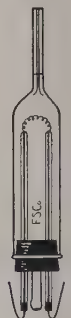


10-655

10-630. GAS PIPETTE, Fisher, Plain Absorption. A standardized absorption pipette of the two-compartment type, with glass tubes in the absorption compartment to increase the absorption area. Made to exact design and specifications, and can be used with any of the Fisher Standardized Apparatus, No. 10–600, No. 10–605, No. 10–610, No. 10–615, or No. 10–625, and can be used in any special modifications of these. **Each, $3.25**

10-635. GAS PIPETTE, Fisher, Plain Absorption, with Copper Strips and Glass Tubes. A special pipette for use with cuprous chloride solutions; the copper strips react with the solution, and thus maintain the cuprous condition. Fits any of the Fisher Standardized Types of Apparatus, and can be substituted for one of the regular pipettes, if desired. **Each, $3.75**

10-640. GAS PIPETTE, Fisher, Absorption, with outlet at the bottom. This pipette is so constructed that both chambers can be completely drained by removing the rubber stopper at the bottom, and new solution added, without removing the pipette from the apparatus.

This pipette can be filled with glass tubes, and copper wires can also be inserted, if desired. For use with solutions which attack rubber, the stopper can be coated with paraffin.

It is not used in the regular Fisher Types of Apparatus, but it can be substituted for any of the plain absorption pipettes without any alterations of the apparatus. **Each, $3.25**

10-645. GAS PIPETTE, Fisher, Bubbling. With two (2) compartments and a tube extending into the absorption compartment, which permits the gas to bubble up through the absorbent. It has a tested three-way capillary stopcock which seals the pipette, or connects the bubbling tube, or with a half-turn connects with both the pipette and the bubbling tube, so that the gas can be withdrawn from both at the same time. Recommended for the complete and rapid absorption of CO or O_2 by cuprous chloride solution, which solution, on account of its low viscosity, does not readily adhere to the glass tubes in the plain absorption pipettes. Also recommended for the absorption of CO_2 by pyrogallol, and illuminants by oleum.

This bubbling pipette effects an intimate contact of the gas with the solution, and at the same time causes the solution to circulate, thereby bringing new solution into contact with the gas. This is used with the Fisher Standardized Apparatus, No. 10–600, No. 10–610, No. 10–615, or No. 10–625, and it can also be substituted for the plain pipettes in any of the Fisher Standard Apparatus, or embodied in any modifications of them, if desired. **Each, $7.50**

10-650. GAS PIPETTE, Fisher, Phosphorus. With opening at the bottom of the absorption chamber for inserting stick phosphorus, and a trap to prevent the spent phosphorus, P_2O_5, from entering the communicating tube. Can also be used where solids or precipitates are involved, as in the absorption of acetylene or phosphene in ammoniacal copper chloride, etc. This pipette can be substituted for any of the regular pipettes in the Fisher Standard Apparatus, No. 10–600, No. 10–610, No. 10–615, or No. 10–625; it can also be embodied in any modification, if desired. **Each, $5.50**

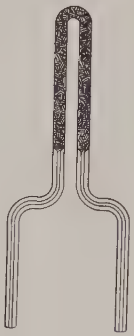
10-655. GAS PIPETTE, Fisher, Slow-Burning (Haldane Type). **Pyrex Glass.** With a platinum heating coil; copper lead wires with platinum terminals, sealed into glass protecting tubes, and held by the rubber stopper. By removing the stopper, the coil is withdrawn from the pipette; the coil is a separate piece of platinum wire and can be readily replaced. To heat the coil requires about two (2) to three (3) amperes at six (6) volts. (For leveling bottle for use with this pipette, see No. 10–785. For transformer equipment for use with 110 volt A.C. current, see No. 10–620.) This pipette can be used with any of the Fisher Standardized Apparatus. **Each, $8.00**

For extra parts for No. 10-655, see page 377.

EXTRA PARTS FOR FISHER STANDARDIZED GAS APPARATUS

10-675

10-680



10-685

10-660. GLASS JACKET, used with No. 10–655 Slow-Burning Pipette; without the coil, tubes, or stopper. **Each, $2.25**

10-665. HEATING COIL, with copper lead wires and platinum terminals, sealed into glass protecting tubes; also rubber stopper. For No. 10–655 Pipette. **Each, $5.00**

10-670. HEATING COIL only, of platinum wire for use with No. 10–655 Pipette.................. **Each, $1.50**

10-675. GAS EXPANSION BAG. Made of flexible rubber for attaching to the top of the rear compartment of Fisher Gas Pipettes to protect the absorption solution from the atmosphere. **Each, $1.40**

10-680. PALLADIUM TUBE, for use with the Fisher Standardized Gas Apparatus. Filled with a special palladium catalyst. **Each, $2.25**

10-685. COPPER OXIDE TUBE, for determining H_2 and CO; used with the Fisher Universal Gas Apparatus No. 10–600. Made of Pyrex glass; filled with copper oxide catalyst. **Each, $2.50**

10-690. GAS BURETTE, for Fisher Universal Gas Apparatus, No. 10-600. A straight burette with a capacity of 100 ml., graduated throughout to $\frac{1}{10}$ ml.; numbered, to read up and down, at every second ml. division; reads directly in per cent. The burette has two (2) three-way stopcocks, tested under a vacuum of 25 inches of mercury. Without compensating tube or water-jacket. **Each, $16.50**

10-695. WATER-JACKET, for No. 10-690 Gas Burette; with a one-hole rubber stopper and a two-hole rubber stopper. **Each, $4.50**

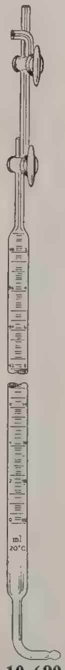
10-700. COMPENSATOR, Vilbrandt, for use with Fisher Universal Gas Analyzing Apparatus, No. 10-600.

The Vilbrandt Compensator consists of a long tube to be immersed in the water bath alongside the burette. Within this tube is sealed another tube with a bulb at its upper end; it is connected to the burette stopcock. To read the volume of gas being measured under "standard" conditions, it is only necessary to vary the pressure on the gas system by raising or lowering the leveling bulb of the burette until the mercury in the compensator returns to a predetermined level. For further details of operation, see "*Journal of Industrial and Engineering Chemistry*", *16*, *936* (*September*, *1924*).

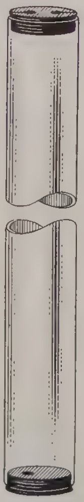
This method of compensating insures measuring the gas under the same pressure and temperature at all times. As the manometer is entirely enclosed in the water-jacket, it too, is maintained at constant temperature while, at the same time, it is out of harm's way and cannot be easily broken. With this compensator, the burette is placed very close to the absorption pipettes and thus saves at least six (6) inches of capillary space, and so reduces the "capillary error" of the apparatus.

The compensator, supplied under this number, consists of the graduated tube sealed inside of the outer cushion-tube.

Each, $8.50



10-690



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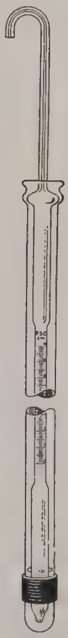
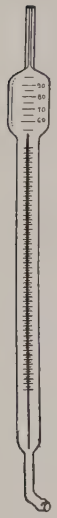


10-700

EXTRA PARTS FOR FISHER STANDARDIZED GAS APPARATUS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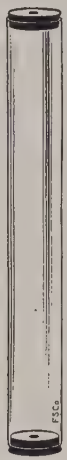
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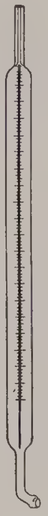
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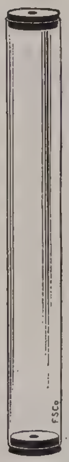
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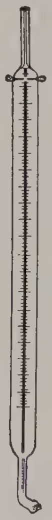
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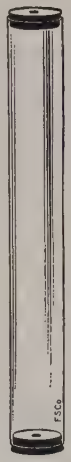
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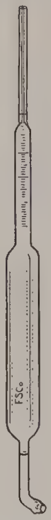
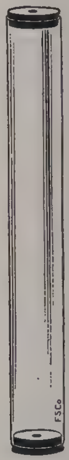

10-735


10-740

10-705. GAS BURETTE, for Fisher Type B (No. 10-605) and Type C (No. 10-610) Gas Apparatus. It has a capacity of 100 ml., with a bulb on the top; the lower portion of the burette is graduated from Zero to 50 ml. in $\frac{1}{10}$ ml. divisions. The graduated portion has a Schellbach blue-and-white glass back, which facilitates the reading. Without water-jacket. **Each, $6.00**

10-710. WATER-JACKET, for No. 10-705 Burette; with two (2) one-hole rubber stoppers.........**Each, $2.00**

10-715. GAS BURETTE, for Fisher Type D (No. 10-615) Gas Apparatus. A straight type burette with a capacity of 100 ml., graduated over its entire length in $\frac{1}{5}$ ml. divisions, and numbered up and down at every second ml.; with blue-and-white back to facilitate reading; can be read directly in per cent. With this burette, any per cent of absorption can be measured, and additional air, oxygen, or oxygen-nitrogen mixtures, can be measured. Used with the Fisher Standard Apparatus containing a slow-burning pipette, or any modifications which use a slow-burning pipette. Without water-jacket. **Each, $6.00**

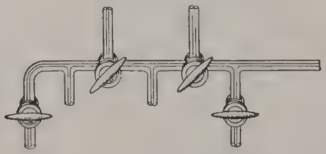
10-720. WATER-JACKET, for No. 10-715 Burette; with two (2) one-hole rubber stoppers. ....**Each, $2.00**

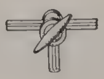
10-725. GAS BURETTE, Explosion; with heavy platinum electrodes sealed in. Straight type, capacity 100 ml. graduated in $\frac{1}{5}$ ml., numbered at every second ml. to read up and down. Can be substituted for the regular burette in Fisher Gas Apparatus, Types B, C, or D, or any modifications of them, if desired. Current for this can be obtained from the No. 10–840 Ignition Apparatus. Without water-jacket. **Each, $9.00**

10-730. WATER-JACKET, for No. 10-725 Burette; with two (2) one-hole rubber stoppers.........**Each, $2.00**

10-735. GAS BURETTE, for No. 10-625 Commercial Gas Apparatus. Capacity, 100 ml.; top is constricted and the upper 2 ml. is graduated in 0.05 ml. divisions. Can be read directly in per cent. This burette can also be embodied in Types B, C, and D Apparatus for determining the impurities in "cylinder" gases. Without water-jacket. **Each, $5.00**

10-740. WATER-JACKET, for No. 10-735 Burette; with two (2) one-hole rubber stoppers.... . . **Each, $2.00**

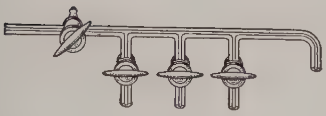

10-745


10-750

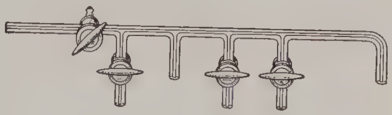
10-745. MANIFOLD, for Fisher Universal Gas Apparatus, No. 10-600. Made of heavy capillary glass tubing with two (2) two-way stopcocks, two (2) plain outlets for bubbling pipettes, and two (2) special stopcocks, for the copper oxide tube, which can be adjusted to pass the gases in any of three (3) different directions. All stopcocks are designed especially for this use, have small bores, and are tested under a vacuum of 25 inches of mercury. Does not include No. 10–750 Inlet Stopcock. **Each, $13.00**

10-750. INLET STOPCOCK, for Fisher Universal Gas Apparatus. A three-way stopcock to be attached to the top of the burette; sample is introduced through one (1) arm, and additional oxygen through the other. Stopcock is tested under a vacuum of 25 inches of mercury. **Each, $3.00**

EXTRA PARTS FOR FISHER STANDARDIZED GAS APPARATUS



10-755



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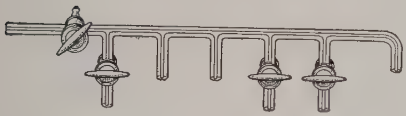

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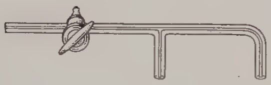


10-770

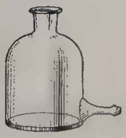
10-755. MANIFOLD, for Fisher Type B Gas Apparatus, No. 10-605. Made of heavy capillary glass tubing, with three (3) two-way stopcocks and a three-way stopcock at the inlet. All stopcocks are designed especially for this use, have small bores, and are tested under reduced pressure. **Each, $9.00**

10-760. MANIFOLD, for Fisher Type C Gas Apparatus, No. 10-610. Made of heavy capillary glass tubing, with three (3) two-way stopcocks, a branch for the bubbling pipette, and a three-way stopcock at the inlet. All stopcocks are designed for this use, have small bores, and are tested under reduced pressure. **Each, $10.00**

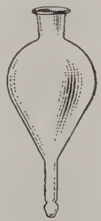
10-765. MANIFOLD, for Fisher Type D Gas Apparatus, No. 10-615. Made of heavy capillary glass tubing, with three (3) two-way stopcocks, two (2) plain connections for the bubbling pipettes, and a three-way stopcock at the inlet. All stopcocks are designed for this use, have small bores and are tested under reduced pressure. **Each, $12.00**

10-770. MANIFOLD, for Fisher Type E Gas Apparatus, No. 10-625. Made of heavy capillary glass tubing with plain branch for the bubbling pipette, and a three-way stopcock at the inlet. Stopcock is tested under reduced pressure. **Each, $4.00**

MANIFOLDS, for any combinations of pipettes will be made to order.



10-775



10-780
10-785

10-790

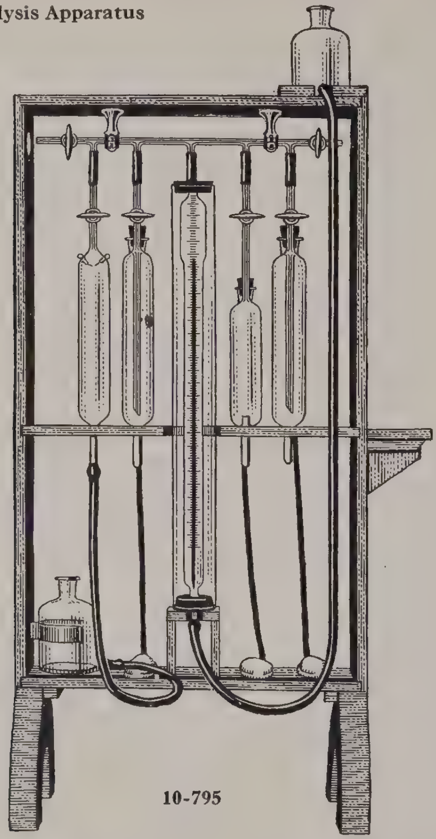
10-775. LEVELING BOTTLE, for use with Fisher Gas Apparatus. Capacity, 150 ml., with outlet at the bottom which is shaped to hold rubber tubing. Used with the burettes in the portable case, also with the Slow-Burning Pipettes. **Each, $ .80**

10-780. LEVELING BULB, for use with Fisher Gas Apparatus. Used in connection with the burette on the Universal Apparatus. Capacity, 250 ml. **Each, $1.00**

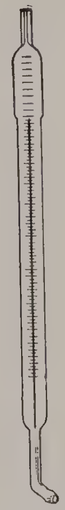
10-785. LEVELING BULB, for use with Fisher Gas Apparatus. Used in connection with the Slow-Burning Pipettes, capacity, 150 ml. **Each, $ .75**

10-790. GAS APPARATUS CONNECTING TUBING, Scimatco. A special steam-cured, jet black, pure rubber tubing, which is strong and pliable, and clings to the glass and prevents leaks. This is 5 mm. inside diameter, and has a 1.5 mm. wall. **Per 10 ft. length, $2.00**

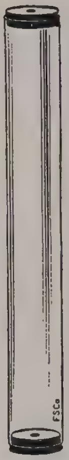
U. S. STEEL CORP. GAS APPARATUS



10-795



10-800



10-805

10-795. GAS APPARATUS, U. S. Steel. According to the latest drawings and specifications; as made in our Glass Blowing Shop for the different laboratories of the subsidiary companies of the U. S. Steel Corporation. The apparatus consists of the following parts:

A—Burette, 100 ml. with bulb at top, graduated in $\frac{1}{10}$ ml.; numbered from zero upward, every second ml.; with blue-and-white glass back.

B—Explosion Pipette with heavy platinum electrodes and stopcock; used to determine combustibles other than illuminants.

C—Bubbling Pipette with tested three-way stopcock and opening at the bottom of the absorbing chamber for introducing solid reagents, copper turnings, etc. It is most frequently charged with potassium hydroxide to absorb CO_2.

D—Bubbling Pipette with tested three-way stopcock similar to Pipette C, but without the opening at the bottom of the absorbing chamber. It is used with fuming sulphuric acid for absorbing illuminants. (*This is the pipette mounted at the extreme right.*)

E—Phosphorus Pipette with stopcock at the top, with trap and outlet at the bottom; used with stick phosphorus to absorb oxygen.

F—Manifold with five (5) branches and two (2) three-way stopcocks, tested under reduced pressure.

G and **H**—Leveling Bottles, 250 ml.

The apparatus support has a shelf on the side for holding the gas collecting tube while its contents are being drawn into the burette. A No. 10–935 Sampling Tube is usually used for this purpose.

The Gas Apparatus supplied under this number consists of parts A, B, C, D, E, F, G, and H, mounted on a special wooden support; three (3) rubber expansion bags and the necessary Scimatco Laboratory Tubing connections for these parts. **Each, $65.00**

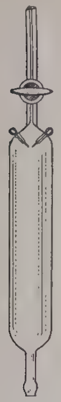
EXTRA PARTS FOR U. S. STEEL CORP. APPARATUS NO. 10-795

10-800.	**BURETTE** (Part A), without water-jacket	**Each, $7.00**
10-805.	**WATER-JACKET,** for No. 10–800 Burette, with stoppers.	**Each, $2.50**

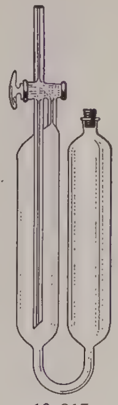
(*Other extra parts for No. 10-795 are on page 381.*)

EXTRA PARTS FOR U. S. STEEL GAS APPARATUS

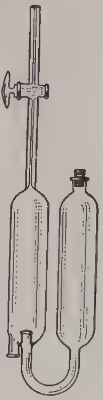
No. 10-795



10-810



10-815
See also No. 10-812



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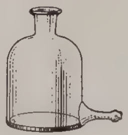

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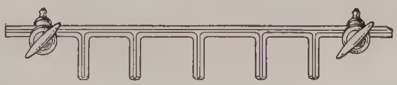


10-825

10-810. EXPLOSION PIPETTE (Part B), with heavy platinum terminals and double-loop connectors; inserted in a reinforced seal. Fitted with a stopcock tested under reduced pressure. **Each, $6.00**

IGNITION APPARATUS, for use with No. 10-810 Explosion Pipette, see No. 10-840.

10-812. BUBBLING PIPETTE, with opening at the bottom (Part C). With tested three-way stopcock to withdraw the gas from both the tube and the chamber in one position. This pipette is similar to No. 10-815, excepting that it has an opening at the bottom of the absorbing chamber similar to that shown on the No. 10-820 Pipette. **Each, $8.25**

10-815. BUBBLING PIPETTE (Part D). With tested three-way stopcock. Used with fuming sulphuric acid for absorbing illuminants. **Each, $7.50**

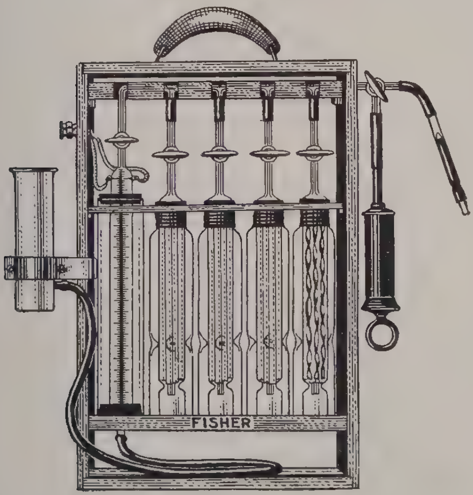
10-820. PHOSPHORUS PIPETTE (Part E); with trap and filling tube; with tested stopcock. ......**Each, $5.50**

10-825. MANIFOLD (Part F); heavy glass of small bore, with five (5) branches and two (2) three-way stopcocks tested under reduced pressure. **Each, $8.50**

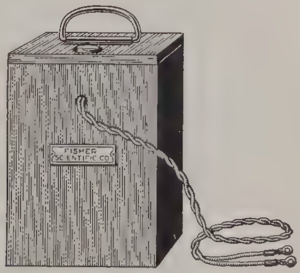
10-830. LEVELING BOTTLE (Parts G and H). Used with the burette, also with the Explosion Pipette. Capacity, 250 ml. **Each, $ .90**

GAS EXPANSION BAGS, for use with the Pipettes, see No. 10-675.

GAS CONNECTIONS of Scimatco Tubing, see No. 10-790.



10-835


FISHER SCIENTIFIC CO.

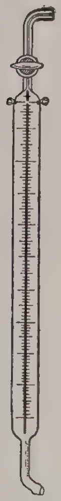
10-840

10-835. GAS APPARATUS, Williams Type, Model A. With four absorption pipettes and an explosion burette. The absorption pipette has a three-way stopcock, and an inlet tube which carries the gas to the bottom and allows it to bubble up through the absorption chamber, which is filled with glass tubes. This pipette is open at the bottom, and is surrounded by a pipette jar which acts as a reservoir for the solution. Burette has platinum terminals sealed in, has a capacity of 100 ml. graduated in $\frac{1}{5}$ ml. divisions, and has a blue-and-white glass back. The No. 10–840 Ignition Apparatus is used in connection with this explosion burette. Supplied with a hard rubber pump and a Bunsen valve, for drawing samples into the apparatus, and a leveling jar. In portable hardwood carrying case, without induction coil or battery. **Each, $65.00**

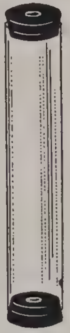
10-840. IGNITION APPARATUS, for use with the Explosion Burette on No. 10–835 Gas Apparatus. Consists of a high-tension induction coil and dry batteries for generating the current. Mounted in a hardwood carrying case with push-button contact on the top; with lead wires for connecting to the binding posts on the Gas Apparatus. This is a convenient piece of apparatus to use with any Explosion Pipette, Burette, Eudiometer or Lecture Apparatus. **Each, $12.00**

EXTRA PARTS FOR No. 10-835 GAS APPARATUS

WILLIAMS TYPE



10-845



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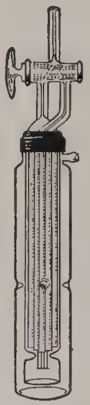
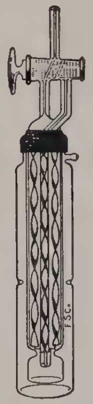
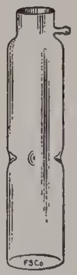


10-855



10-860



10-865

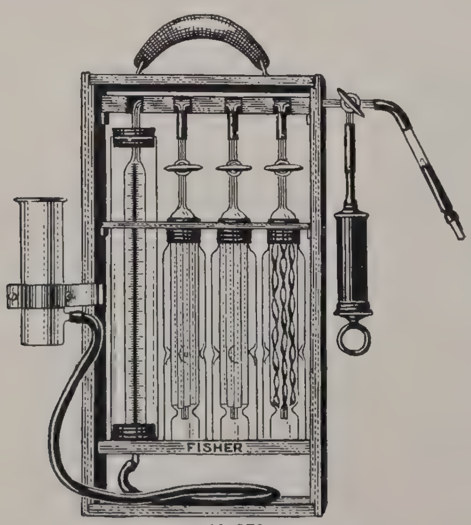
10-845. BURETTE, for No. 10-835 Apparatus. With platinum electrodes, without water jacket.... **Each, $12.00**

10-850. WATER JACKET, for No. 10-845 Burette. Short type, to fit under electrodes. .... **Each, $1.75**

10-855. PIPETTE, Absorption, for No. 10-835 Apparatus. Complete with separate jacket, glass tubes, and rubber connector. **Each, $9.50**

10-860. PIPETTE, Absorption, for No. 10-835 Apparatus, with separate jacket, glass tubes, copper strips, and rubber connector. **Each, $9.50**

10-865. JACKET only, for Pipettes No. 10-855 and No. 10-860, without rubber connector. .... **Each, $2.50**



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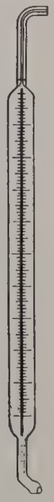

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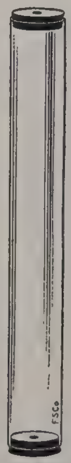


10-880

10-870. GAS APPARATUS, Williams Type, Model B. Similar to No. 10–835, but with three absorption pipettes, and the burette without the electrodes. A simpler form, for flue gas analysis. **Each, $45.00**

10-875. BURETTE, for No. 10-870 Apparatus, without jacket................................ **Each, $10.00**

10-880. JACKET, with stoppers, for No. 10-875 Burette .... **Each, $1.75**

Extra pipettes for No. 10-870, see No. 10-855 and No. 10-860.

The different absorbents are made according to approved formulas evolved at the U. S. Bureau of Mines, U. S. Bureau of Standards, and our own laboratory. They are all ready for use.

10-885

10-895

10-912

GAS ABSORBENTS

10-885. CAUSTIC POTASH, for the determination of carbon dioxide, sulphur dioxide, sulphur trioxide, hydrogen sulphide, and chlorine. **Per Liter Bottle, $3.50**

10-890. CAUSTIC SODA, for the determination of carbon dioxide, sulphur dioxide, sulphur trioxide, hydrogen sulphide, and chlorine. **Per Liter Bottle, $3.50**

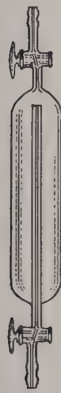
10-895. CUPROUS CHLORIDE, Acid, for the determination of carbon monoxide....... **Per Liter Bottle, $3.75**

10-900. CUPROUS CHLORIDE, Alkaline, for the determination of carbon monoxide, and acetylene. **Per Liter Bottle, $3.75**

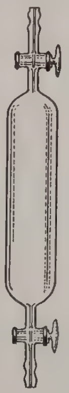
10-905. CUPROUS AMMONIUM CHLORIDE, for the determination of oxygen....... **Per Liter Bottle, $4.00**

10-910. FUMING SULPHURIC ACID, 20% Oleum, for the determination of unsaturated hydrocarbons. **Per Pound Bottle, $1.75**

10-912. ALKALINE PYROGALLATE, Potassium, for the determination of oxygen; supplied in two bottles, with directions for use. **Per Liter, $4.00**



10-915



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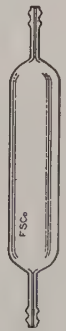

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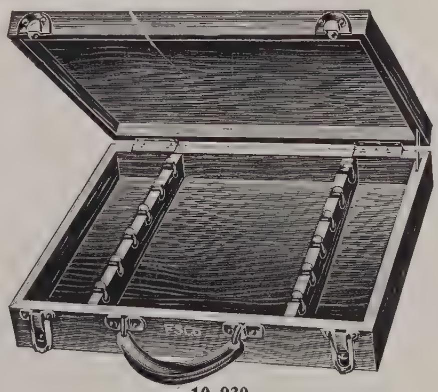


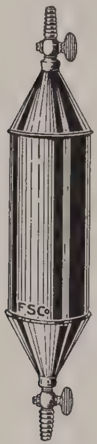
10-930

10-915. GAS SAMPLING TUBE, Glass, U. S. Bureau of Mines. This tube has special offset stopcocks, at top and bottom, and a glass tube extending into the tube. By filling the tube with mercury or water, connecting the top to the gas to be sampled, and adjusting the lower stopcock, a representative sample can be collected over a long period, at the same "head," or rate, over the entire period. Capacity, about 250 ml. **Each, $5.00**

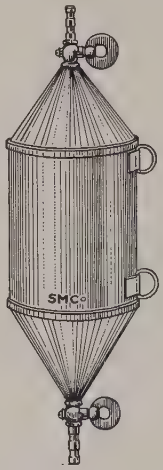
10-920. GAS SAMPLING TUBE, Glass, with Stopcocks. The usual form with stopcocks at top and bottom; used for taking a "grab" sample. Capacity, about 250 ml. **Each, $3.75**

10-925. GAS SAMPLING TUBE, Glass, Plain, with ends to connect to rubber tubing to be closed by pinchcocks. Capacity, about 250 ml. Supplied without tubing or pinchcocks. **Each, $1.50**

10-930. CARRYING CASE, for Gas Sampling Tubes. This case is made of hardwood, 14x18 inches outside, and is provided with separate racks for holding six (6) gas sampling tubes. Each tube is held by two (2) metal clips so that it cannot fall out with the case in any position. The case has two (2) clasps, is equipped with a carrying handle and provides a convenient means for the safe carrying of gas sample tubes. In ordering state whether style No. 10–915, No. 10–920 or No. 10–925 Sample Tubes are to be carried in the case. **Case,** without tubes, **Each, $12.00**



10-935



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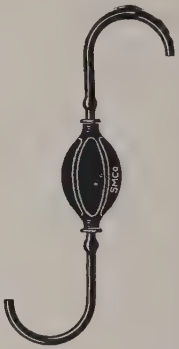
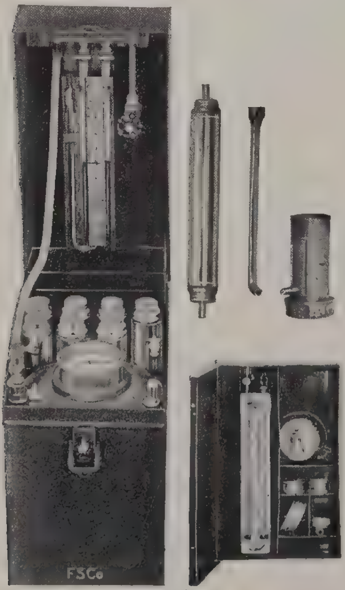


10-945

10-935. GAS SAMPLING TUBE, Copper. With stopcocks at top and bottom; will withstand rough usage and can be used to collect hot gases. The stopcocks are "gas" stopcocks with precisely fitted plugs and have rubber tubing connections. The sampling tube is 2⅝ inches diameter and holds about 750 ml. Length over all 16 inches. **Each, $6.00**

10-940. GAS SAMPLING TUBE, Zinc, for large samples, with stopcocks, at top and bottom. The sampling tube is 4½ inches diameter and holds about 2000 ml. Length over all 16 inches. **Each, $7.00**

10-945. GAS SAMPLING RUBBER BULB, Suction or Pressure. With hard rubber check valves, and rubber tubing connections. Can be used to draw gases from the source, to draw samples into the sampling tubes, or to pass them into gas analysis apparatus. Capacity, about 75 ml. **Each, $ .85**



10-950

OBERFELL
GAS TESTING APPARATUS
PORTABLE

10-950. GAS TESTING APPARATUS, Oberfell, Portable, for determining the gasoline content, Specific Gravity, and rates of flow of natural gas. This apparatus has been designed for field testing at the wells and pipe lines and for checking the efficiency of absorption and compression gasoline plants.

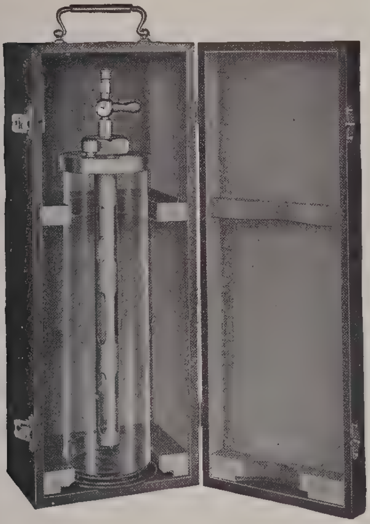
The apparatus consists of a 100 cu. ft. gas meter, graduated to read to 0.001 cu. ft.; a differential flow gauge and eight (8) absorption tubes filled with activated charcoal for determining the gasoline content of the gas. Apparatus also contains an orifice meter with seven (7) orifice plates, and a flow meter to be used in conjunction with the differential gauge, for determining the Specific Gravity of the gas and measuring rates of flow up to 300,000 cu. ft. per 24 hours A Pitot tube, pressure gauge and thermometer, for measuring larger rates of flow, are also supplied.

The entire apparatus is conveniently packed in a metal carrying case, finished in black rust-proof crystallized lacquer, and fitted with a leather handle.

Oberfell Gas Testing Apparatus as described, with directions for operating. **Each, $250.00**

SPECIFIC GRAVITY APPARATUS

For Gases



10-955

10-960

10-955. GAS APPARATUS, Shilling, Specific Gravity. Used to determine the Specific Gravity or density of a gas by the effusion method. It is usually employed in the field for testing the Specific Gravity of natural gas, as an index of its gasoline content.

For method of operation, see U. S. Bureau of Standards Technological Paper No. T-89.

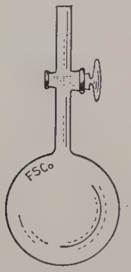
Based on the fact that the times required for the escape of equal volumes of two gases, under the same pressure, through the same small orifice, are approximately proportional to the square roots of the densities of the gases. Hence, by noting the time of effusion, the density can be calculated.

$$\text{Sp. Gr.} = \frac{\text{d (gas)}}{\text{d (air)}} - \frac{\text{t}^2\text{ (gas)}}{\text{t}^2\text{ (air)}}$$ (d = density. t = time of effusion as measured by this apparatus.)

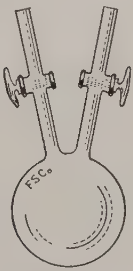
The apparatus consists of a glass jar 3½ inches diameter by 12 inches deep, containing an armored glass tube which is attached to a brass plate at the top of the jar. Attached to the top plate, is a three-way brass stopcock which contains a small, protected glass tip. This tip contains a small platinum disc with a standard orifice. Stopwatch No. 10–960 is used with this apparatus for timing the effusion.

Complete in wooden carrying case with handle. Without stopwatch. **Each, $39.00**

10-960. STOPWATCH, for determining the time of effusion in No. 10-955 Apparatus. Dial reads in ⅕ seconds; is started, stopped, and returned to zero, by pressing the stem. Jeweled movement, in nickel case. **Each, $13.50**



10-962

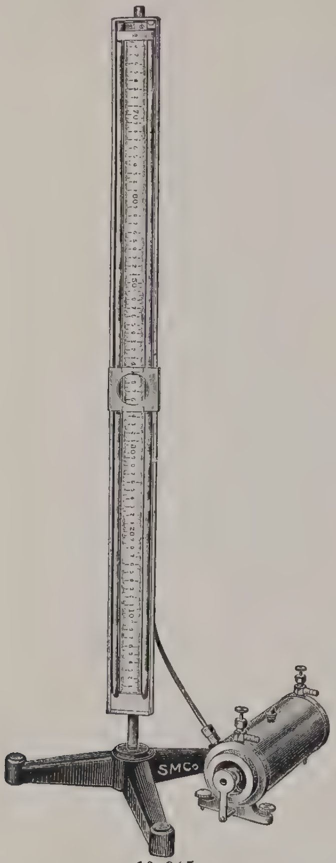


10-963

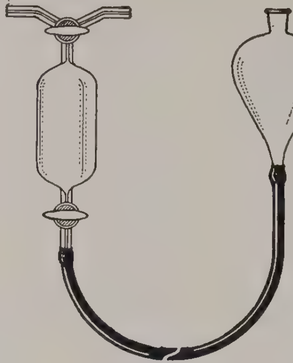
10-962. GAS BALLOON, made of blown glass, for weighing gases. Diameter of bulb, 3 inches. With neck and stopcock. **Each, $1.80**

10-963. GAS BALLOON, with two necks and two stopcocks; made of blown glass, for weighing gases. Diameter of bulb, 3 inches. **Each, $2.80**

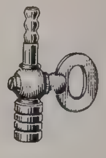
Gas Density Balance



10-965

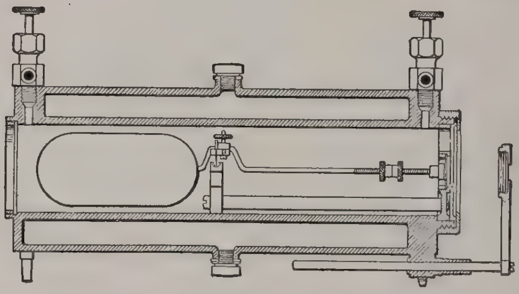


10-970



10-980

10-975



Cross-section of gas chamber No. 10-965

10-965. GAS DENSITY BALANCE, Edwards, developed at the U. S. Bureau of Standards. See *Technological Paper No. 89.*

The beam of the balance has a sealed cylinder at one end and an adjustable, counterpoising weight at the other. This is enclosed in a gas chamber which can be filled with different gases to be tested, under pressure, and the pressure released until the balance is observed to be in equilibrium. A mercury manometer attached to the gas chamber indicates the pressure at which equilibrium occurs.

The density of a gas (according to Boyle's Law) is proportional to its pressure; and the buoyant force exerted upon a body suspended in that gas, is proportional to the density of the gas, and therefore, to its pressure. Hence, by first using air or pure hydrogen, and then the gas sample, obtaining the same buoyant effect in the balance, and noting the different pressures as indicated on the manometer, at which this takes place, the density of the gas can be determined. The Specific Gravity of a gas is usually referred to dry air, free from carbon dioxide, as unity.

Note: The following apparatus is used with this balance: a barometer for observing the atmospheric pressure, a small vacuum pump for exhausting the chamber, and a pressure generating bottle with mercury, for increasing the gas pressure. Any of these items can be supplied, if desired. See No. 10-970 for gas pressure generator.

Apparatus consists of balance mounted in a water-jacketed gas chamber; a manometer, graduated in millimeters, mounted on support and with sufficient mercury to fill it; and a connecting tube.

Each, $150.00

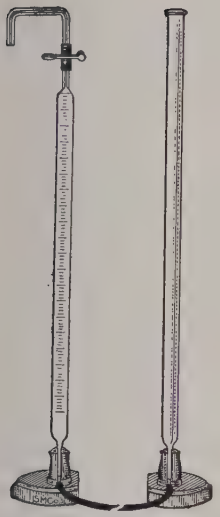
10-970. GAS COMPRESSING BOTTLE, for No. 10-965 Balance; with three-way stopcock at the top, and two-way stopcock at the bottom. Supplied with a leveling bulb for increasing the pressure; with rubber tubing, without mercury. **Each, $7.00**

10-975. GAS BAG, Large, Rubber, for collecting and storing large samples of gases. Well suited for lecture purposes. Used with No. 10-980 Stopcocks, but supplied under this number without stopcock.

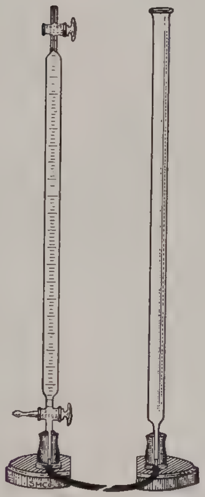
Capacity, gallons	1	2
Each	**$5.50**	**6.00**

10-980. STOPCOCK, Brass, for use with No. 10-975 Gas Bags for connecting the bag to rubber tubing. Fits either size bag. **Each, $1.35**

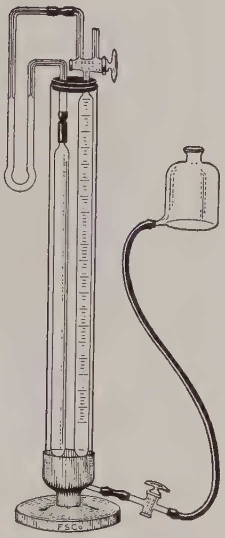
HEMPEL GAS APPARATUS



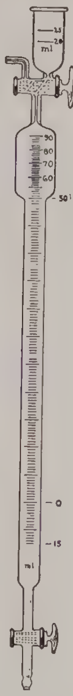
10-995



11-015



11-025



11-035

11-040

10-995. GAS BURETTE, Hempel, without stopcocks, Complete Set. Burette has 100 ml. capacity, graduated in $\frac{1}{5}$ ml. divisions, and is numbered to read both up and down, at every second ml. A bent glass tube for the introduction of the gases is provided at the top, and this is connected to the burette with Scimatco Laboratory Tubing. A pinchcock is also supplied. The leveling tube and the burette are mounted on wooden bases which are weighted with lead in the bottom to prevent tipping. The burette and leveling tube are connected by Scimatco Laboratory Tubing. **Per Set,** complete, **$6.50**

11-000. BURETTE, without stopcocks, for No. 10-995 Set. Graduated tube only, without base, connecting tube or rubber tubing. **Each, $2.50**

11-005. LEVELING TUBE, for No. 10-995 or No. 11-015 Sets; without base or rubber tubing..... **Each, $1.00**

11-010. BASE, for No. 10-995 or No. 11-015 Burettes and Leveling Tubes. Made of wood, weighted with lead in the bottom. The same base holds either of the burettes or leveling tubes. **Each, $1.50**

11-015. GAS BURETTE, Hempel, with stopcocks, Complete Set. Burette has 100 ml. capacity, graduated in $\frac{1}{5}$ ml. divisions, and is numbered to read both up and down, at every second ml. There is a two-way stopcock at the top and a three-way stopcock at the bottom. Leveling tube and burette are mounted on weighted wooden bases, and connected by Scimatco Laboratory Tubing. **Per Set,** complete, **$9.50**

11-020. BURETTE, with stopcocks, for No. 11-015 Set. Graduated tube with stopcocks, without base or rubber tubing. (For Leveling Tube, see No. 11–005; for Bases, see No. 11–010.) **Each, $5.50**

11-025. GAS BURETTE, Hempel, Precision. A more precise burette for use with the Hempel absorption pipettes. Burette is straight with a three-way stopcock at the top, has a capacity of 100 milliliters, graduated in $^1/_{10}$ ml., and numbered, to read both up and down, at every second ml.

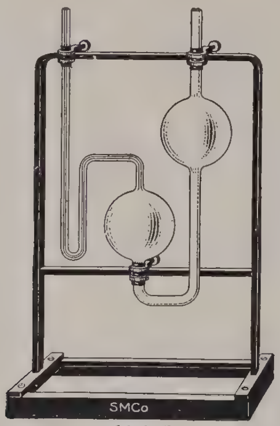
The burette is enclosed in a water jacket which is mounted on a weighted wooden support; a stopcock for connecting to the bottom of the burette is supplied. A leveling bottle is connected to the burette with Scimatco Laboratory Tubing.

A Compensating Device with closed-end tube is mounted inside the water jacket, and a manometer is inserted between this tube and the burette. This is used to establish the desired pressure. This device compensates for changes of temperature and pressure. **Per Set,** complete, **$17.50**

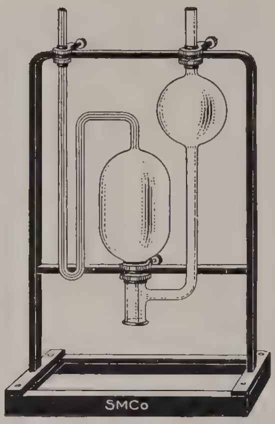
11-030. BURETTE, Hempel, for No. 11-025 Set. Graduated burette with three-way stopcock at top. No other parts. **Each, $8.00**

11-035. GAS BURETTE, Bunte, without water jacket; for measuring and absorbing. Capacity, 100 milliliters from zero to the upper stopcock; 50 ml. portion is graduated in $\frac{1}{5}$ ml. divisions, and the bulb is graduated in one (1) ml. divisions. It is also graduated from zero down to 15 ml. in $\frac{1}{5}$ ml. for measuring the absorbing solution. A graduated funnel on the top is used for introducing the absorbent. See *Dennis' "Gas Analysis," page 74, 1918.* **Each, $7.50**

11-040. WATER JACKET, for No. 11-035 Burette; with two (2) one-hole rubber stoppers......... **Each, $2.00**



11-045



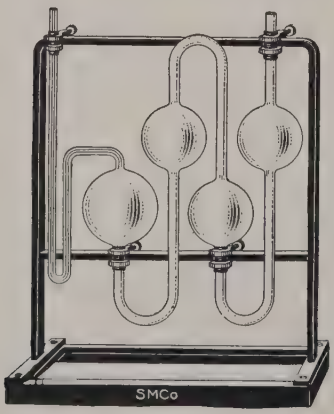
11-055

11-045. GAS PIPETTE, Hempel, Simple, with Support With absorption and expansion bulbs; inlet tube is capillary and has white back; mounted with adjustable clamps and rubber cushions, on a black iron support which has a heavy rectangular base. Pipette packed in separate carton. **Each, $5.00**
Expansion Bag No. 10–675 can be used to protect the solution from the atmosphere.

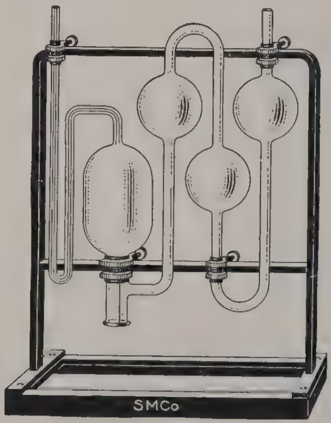
11-050. PIPETTE, for No. 11-045. Glass Pipette only, packed in separate carton.................**Each, $2.50**

11-055. GAS PIPETTE, Hempel, Simple, with Support; for **solid** and **liquid** absorbents. Absorbent chamber has opening at the bottom, through which solid reagents can be introduced, or glass tubes inserted to increase the absorption area. Inlet tube is capillary, and has white back. Mounted with adjustable clamps and rubber cushions, on black iron support which has a heavy rectangular base. Pipette packed in separate carton. **Each, $5.75**

11-060. PIPETTE, for No. 11-055. Glass pipette only, packed in separate carton.................**Each, $3.25**



11-065



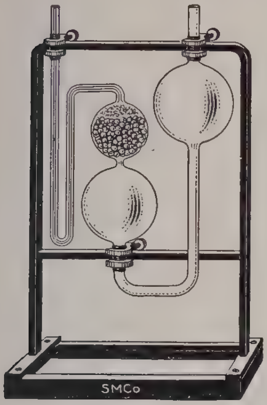
11-075

11-065. GAS PIPETTE, Hempel, Compound with Support. Same as No. 11 045 with two additional bulbs, which serve as a liquid seal and protect the reagent from the atmosphere. Mounted with adjustable clamps and rubber cushions, on a black iron support which has a heavy rectangular base. Pipette packed in separate carton. **Each, $7.50**

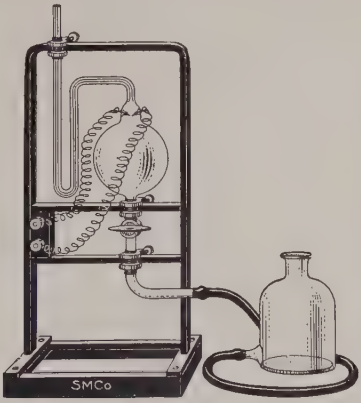
11-070. PIPETTE, for No. 11-065. Glass pipette only, packed in separate carton.................**Each, $4.25**

11-075. GAS PIPETTE, Hempel, Compound, with Support, for **solid** and **liquid** absorbents. Same as No. 11 055 with two (2) additional bulbs which serve as a liquid seal and protect the reagent from the atmosphere. Mounted with adjustable clamps and rubber cushions, on a black iron support which has a heavy rectangular base. Pipette packed in separate carton. **Each, $8.25**

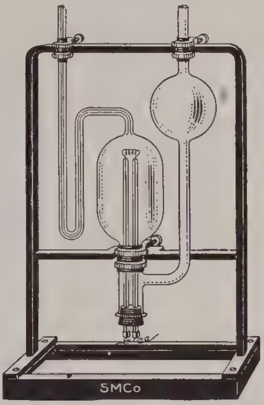
11-080. PIPETTE, for No. 11-075. Glass pipette only, packed in separate carton.................**Each, $5.00**



11-085



11-095



11-105

11-085. GAS PIPETTE, Hempel, Ethylene, with Support; with glass beads in the upper absorption chamber; inlet tube is capillary and has white back. Used to absorb ethylene and similar unsaturated hydrocarbons. Mounted with adjustable clamps and rubber cushions, on a black iron support which has a heavy rectangular base. Pipette packed in separate carton. **Each, $6.50**

11-090. PIPETTE, for No. 11-085. Glass pipette only, packed in separate carton.................**Each, $4.00**

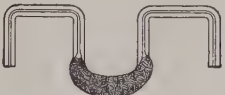
11-095. GAS PIPETTE, Hempel, Explosion, with Supports. Pipette has platinum electrodes sealed in, and a stopcock at the bottom; inlet tube is capillary and has white back. Mounted with adjustable clamps and rubber cushions, on a black iron support which has a heavy rectangular base. With separate leveling bottle, 250 ml. capacity, and rubber tubing connections. (For current for this pipette, see No. 10–840 Ignition Apparatus.) **Each, $10.00**

11-100. PIPETTE, for No. 11-095. Glass pipette only, without leveling bottle or support, packed in separate carton. **Each, $6.00**

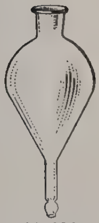
11-105. GAS PIPETTE, Winkler, Slow-Burning, with Support; for determining methane and ethane and other combustible gases. With platinum coil, copper-lead wires, and platinum terminals sealed into glass protecting tubes, and held by the rubber stopper. The coil is a separate piece of platinum wire and can be readily replaced. Requires about two (2) to three (3) amperes at six (6) volts. For transformer with rheostat for use on 110 volt A.C. current, see No. 10–620. Mounted with adjustable clamps and rubber cushions, on black iron support which has a heavy rectangular base. **Each, $10.00**

11-110. PIPETTE, for No. 11-105. Glass pipette, with coil, complete, but without support........ **Each, $7.50**

11-115. EXTRA COIL, with copper-lead wires, terminals and protecting tubes and rubber stopper; for No. 11–105. **Each, $5.00**



11-125



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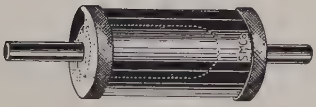


11-130

11-135

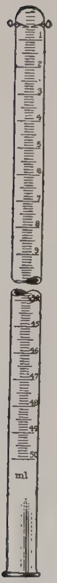
11-120. LEVELING BULBS, with outlet, shaped to hold rubber tubing.

Capacity, ml	125	250
Each	**$ .75**	**1.00**

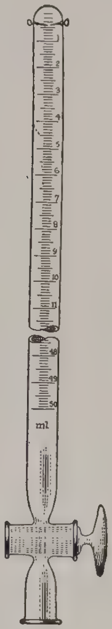
11-125. PALLADIUM TUBE, Hempel; filled with a special palladium catalyst for absorbing hydrogen. Shaped so the palladium bulb can be immersed in water at 70 to 90° C. **Each, $2.50**

11-130. GAS APPARATUS, for dust determination. Made of brass; top and bottom screwed on; top has tube projecting into the cylinder to which a filtering thimble is clamped. The filter is easily removed for weighing. **Each, without filters, $7.50**

11-135. FILTERS, for No. 11-130 Apparatus; for determining the quantity of dust in gases. Size of thimbles, 77 x 30 mm. **Per Box** (25 Filters), **$3.25**



11-140



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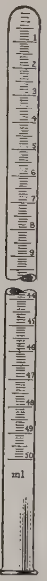

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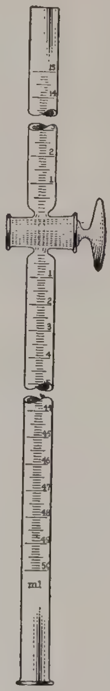

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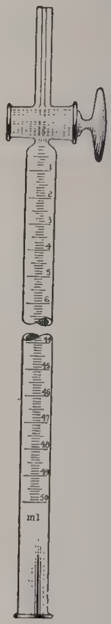


11-160

GAS APPARATUS, DuPont Nitrometer. See Nitrogen Determination Apparatus, pages 477-478.

GAS APPARATUS, Kjeldahl. See Nitrogen Determination Apparatus, pages 473-476.

11-140. GAS MEASURING TUBES (Eudiometers), Bunsen, with platinum electrodes, for igniting mixtures of combustible gases, graduated from zero down.

Capacity, ml	50	100
Smallest subdivisions, ml	$^1/_{10}$	$^1/_5$
Each	**$3.25**	**3.50**

11-145. GAS MEASURING TUBES (Eudiometers), Mitscherlich, with glass stopcock and platinum electrodes, for igniting mixtures of combustible gases; graduated from zero down. Stopcock has large bore; a funnel on the bottom permits the collection of gases over a pneumatic trough.

Capacity, ml	50	100
Smallest subdivisions, ml	$^1/_{10}$	$^1/_5$
Each	**$4.75**	**5.00**

11-150. GAS MEASURING TUBES, Simple Form. Made of glass with closed top; tube graduated from zero downward.

Capacity, ml	50	100
Smallest subdivisions, ml	$^1/_{10}$	$^1/_5$
Each	**$1.25**	**1.50**

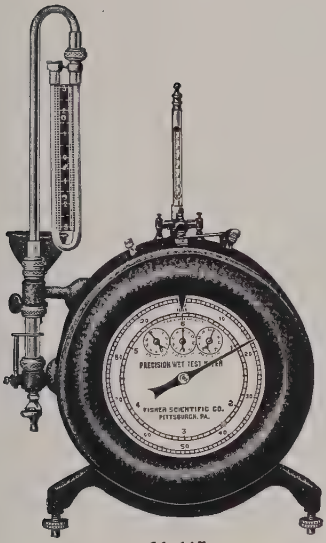
11-155. GAS MEASURING TUBE, Kahlenberg. Made of glass, with tube graduated from zero down to 50 milliliters in $^1/_{10}$ ml. divisions; stopcock, and a reservoir at the top, graduated from zero up to 15 milliliters in $^1/_{10}$ ml. divisions. *Reference, Kahlenberg — "Laboratory Exercises in General Chemistry."*

Each, $3.00

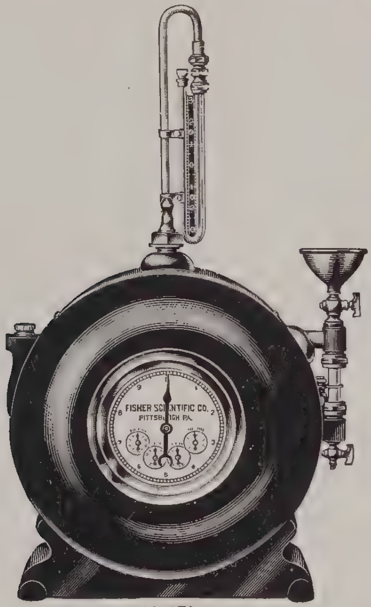
11-160. GAS MEASURING TUBE, with stopcock. Made of glass, with tube graduated from zero down to 50 milliliters in $^1/_{10}$ ml. divisions: provided with a stopcock and tube for connecting to rubber tubing.

Each, $2.25

GAS METERS


PRECISION WET TEST METER
FISHER SCIENTIFIC CO.
PITTSBURGH, PA.

11-165


FISHER SCIENTIFIC CO.
PITTSBURGH PA.

11-170

11-165. GAS METER, Precision. Designed and built for the precise measurement of gas in connection with laboratory determinations, such as moisture, dust, tar, calorific value, volume, flow, etc. The inside reservoir and the revolving drum are made of brass, heavily tinned where in contact with the water or the gas.

The indicator makes a complete revolution for each $^1/_{10}$ cubic foot, and the dial is graduated in 100 divisions, so that **each division represents $^1/_{1000}$ of a cubic foot.** There are three (3) small dials which record one (1) cubic foot, 10 cubic feet and 100 cubic feet, respectively. Records up to 1000 cubic feet.

The workmanship is so precise that the drum will revolve and make accurate measurements of gas at $^1/_{10}$ of one (1) inch water pressure. The meter has the equipment necessary to control all of the operating conditions, so that standard measurements can be made and duplicated.

Leveling: There are two (2) spirit levels on the top and two (2) leveling feet at the front and a stationary foot at the rear. **Water:** The gauge glass with an improved marker (recommended by the U. S. Bureau of Standards), makes it possible to keep the amount of water in the meter at the proper level for standard operating conditions.

Temperature: An armored thermometer is inserted in the gas outlet, so that the temperature can be noted and corresponding corrections made. **Pressure:** A manometer shows the pressure in the meter so that measurements can be made at, or reduced to, standard conditions.

Flow: The rate of flow of gas through the meter can be noted accurately by connecting the electrical contact provided, with a bell or similar device, which will signal the passage of each $^1/_{10}$ cubic foot. If desired, the signaling can be eliminated by opening the switch and withdrawing the contact by means of the screw on the top of the meter.

In calorific tests this signaling device can be connected to an automatic tipping device for changing the flow of water from one bucket to another. The meter has a black instrument finish and the fittings are nickel-plated. **Each, $85.00**

If desired, this meter can be supplied with working parts of **monel metal** for $15.00 additional.

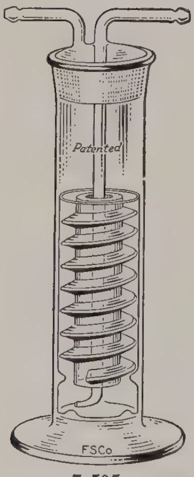
11-170. GAS METER, Laboratory. A larger wet-test meter for laboratory work where large volumes of gas are to be measured.

Large dial reads to $^1/_{100}$ **of a cubic foot, and the small** dial records up to 10,000 cubic feet.

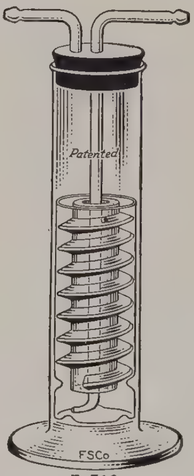
The inside is tinned brass, and the outside is finished in black.

Supplied with water gauge, marker, 6 inch pressure gauge, hose connections and ½″ threaded connection. **Each, $110.00**

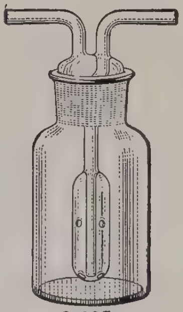
GAS WASHING BOTTLES



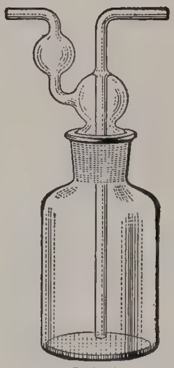
7-505



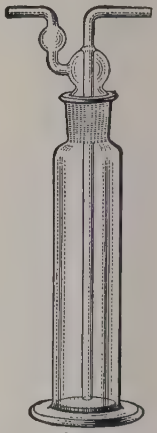
7-510
See also No. 7-512



3-025



3-030



3-035

7-505. GAS WASHING BOTTLE, Milligan, Glass Stoppered. (*Patented February, 1925*), developed by Dr. Lowell H. Milligan while working in the research laboratories of Cornell University. It is 9 inches high and has the absorbing power of a bottle 43 inches high.

The jar contains a glass spiral around which the gas bubbles travel eight (8) times before reaching the top of the spiral. The bubbles then pass through a three-inch settling chamber at the top where any liquid mechanically entrained, settles out. A close fitting shield around the spiral makes it impossible for the bubbles to rise until they have traversed the entire spiral.

The spiral is hollow and open at both ends and the travel of the bubbles causes quite a complete circulation of the solution, upward around the spiral and downward through the middle of it; there is also a downward circulation of the solution outside the shield.

This absorbing bottle can be used for more rapid and more complete absorption; it also replaces larger bottles or it can be used where from two (2) to five (5) bottles were used in series to effect complete absorption. **Each, $5.00**

7-510. GAS WASHING BOTTLE, Milligan, Rubber Stoppered. (*Patented February, 1925.*) This bottle is similar to No. 7–505 excepting that it has a rubber stopper instead of a ground glass stopper. It can be used for most of the gas absorptions usually made, and should be used where liquids are employed which tend to "freeze" glass stoppers. **Each, $3.50**

7-512. GAS WASHING BOTTLE, Milligan, Cork Stoppered. Same as No. 7–510, but provided with a cork stopper for use in absorptions such as light oils, etc., which attack rubber stoppers. **Each, $3.50**

3-025. GAS WASHING BOTTLES, Allihn; made of clear flint glass, with inlet and outlet tubes sealed in the glass stopper. The stopper is ground to fit the neck of the bottle and the inner construction is designed to produce circulation of the liquid.

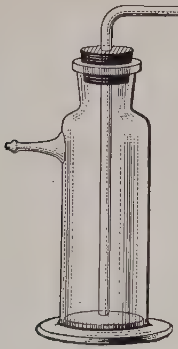
Capacity, ml	250	500
Height of Bottle alone, mm	140	165
Each	**$3.00**	**3.75**

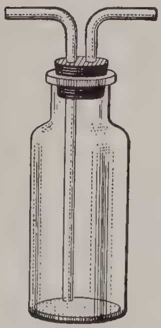
3-030. GAS WASHING BOTTLE, Drechsel, Low Form, of clear flint glass, with inlet and outlet tubes sealed in the glass stopper which is ground to fit the neck of the bottle.

Capacity, ml	125	250	500
Height of Bottle alone, mm	105	140	165
Each	**$2.00**	**2.25**	**2.75**

3-035. GAS WASHING BOTTLE, Drechsel, High Form, of clear flint glass, with inlet and outlet tubes sealed in the glass stopper which is ground to fit the neck of the bottle; bottle has heavy base.

Capacity, ml	125	250	500
Height of Bottle alone, mm	175	235	280
Each	**$2.00**	**2.25**	**2.75**


11-180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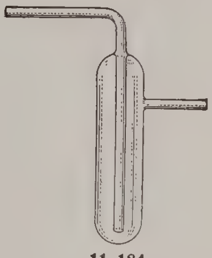
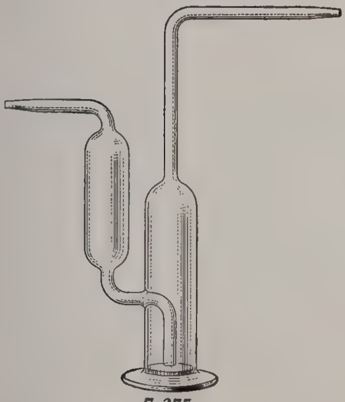

11-184

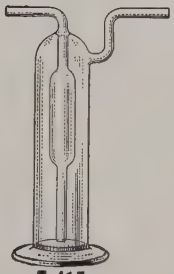
11-180. GAS WASHING BOTTLE, Sillimann, of clear flint glass, with **outlet tube** moulded to the shoulder of the bottle and the inlet tube inserted through a **rubber stopper. The base is moulded**; height of bottle alone, about 210 mm.; to be used with 250 ml. of liquid. **Each, $1.25**

11-182. GAS WASHING BOTTLE, Simple Form, of clear flint glass, with **inlet and outlet tubes** inserted through a rubber stopper.

Capacity, ml	250	500
Height of Bottle alone, mm	145	185
Each	**$ .65**	**.80**

11-184. GAS WASHING BOTTLE, Dudley, Bubbling Tube. A convenient form, to be mounted on a support at any height, or in any position to conform to other apparatus; of lamp-blown glass, made in one piece. Height over all, 175 mm.; capacity, about **50 ml. This tube makes an excellent** gas trap, or mercury check-valve. **Each, $1.00**


7-375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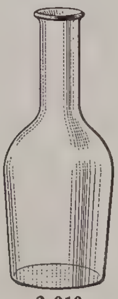
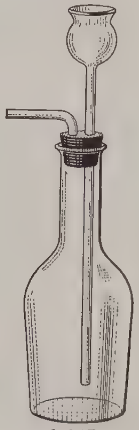

3-010


3-015

See also No. 3-020

7-375. GAS WASHING BOTTLE, Johnson, of clear flint glass, with heavy base; extreme height, about 300 mm.; capacity, about 100 ml. A bulb on the inlet tube acts as a trap to prevent the absorbing solution from getting into the other apparatus, should any back pressure occur. Used singly or in purifying trains. **Each, $2.75**

7-415. GAS WASHING BOTTLE, Fleming, of clear flint glass with heavy base, extreme height, about 190 mm.; capacity, about 100 ml. The enlarged inlet tube prevents the absorbing solution from getting into the other apparatus, should any back pressure occur. Used singly or in trains. **Each, $2.00**

3-010. GAS GENERATING BOTTLES, of moderately heavy glass, designed for generating gases.

Capacity, ml	250	500	1000
Each	**$ .35**	**.55**	**.80**

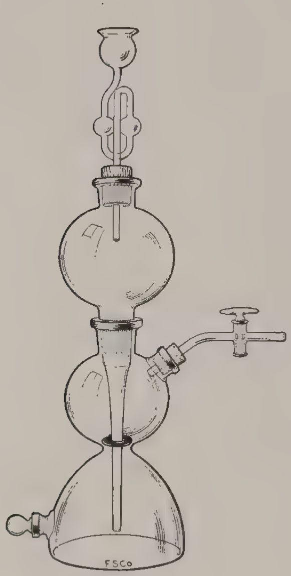
3-015. GAS GENERATING BOTTLES, with fittings; similar to No. 3-010, fitted with rubber stopper, thistle tube for introducing the acid, and a glass tube for taking off the gas.

Capacity, ml	250	500	1000
Each	**$ .60**	**.85**	**1.10**

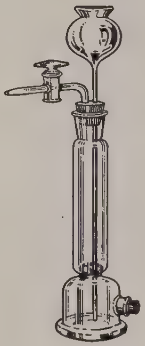
3-020. GAS GENERATING BOTTLE, with safety trap, similar to No. 3-015, but with bulb-trap in thistle tube, to be filled with liquid to prevent the gas from escaping except through the outlet tube.

Capacity, ml	250	500	1000
Each	**$ .85**	**1.10**	**1.35**

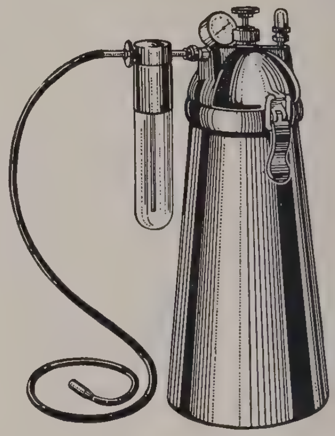
GAS GENERATORS



11-190



11-195



11-200

11-190. GAS GENERATOR, Kipp, with broad base, for generating a continuous supply of hydrogen sulphide, hydrogen, or carbon dioxide, etc.

The body is made of heavy glass, in two parts, with a ground joint between. The lower chamber has a ground glass stopper; the central chamber has a large side opening for filling, and is supplied with a stopper and outlet tube with glass stopcock; a safety funnel is provided in the top. A lead coil is provided to prevent the solid material from falling into the lower chamber.

The supply of gas is made continuous by the automatic action of the generator. As gas is withdrawn the pressure is reduced and liquid reagent is admitted into the central generating chamber which contains the solid reagent. When the flow of gas is stopped, the pressure increases and forces the liquid reagent out of contact with the solid reagent, thus stopping further generation.

Capacity of generating chamber, ml	500	1000	2000
Each	**$8.75**	**11.00**	**15.50**

11-195. GAS GENERATOR, Schroder, Automatic. A simple form of generator for automatically generating a small supply of hydrogen sulphide, hydrogen, or carbon dioxide, etc., for individual student's use or for generating small quantities of gases.

Consists of a heavy glass tower, 10 inches high, with upper generating chamber and a reservoir with outlet at the bottom; a tube with reservoir; glass stopcock and rubber stoppers. The generating tower has a wide opening at the top for filling. A lead spiral prevents the solid material from falling into the lower chamber.

The acid is drawn into the generating chamber or expelled, as the pressure decreases or increases, thus making the action automatic. The generating chamber is 6 inches high and holds about 125 ml.

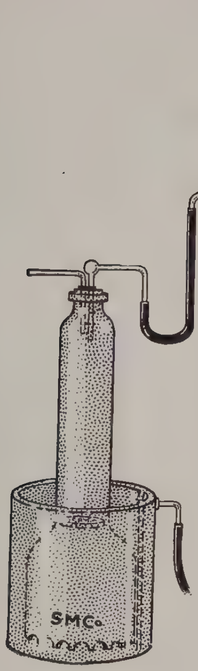
Each, $3.50

11-200. GAS GENERATOR, Oxygen; eliminates oxygen cylinders for laboratory work, portable form, yielding pure oxygen automatically and instantly whenever required, under perfect control. Oxygen is produced by a simple chemical reaction, the contact of fused sodium peroxide (oxone), and water. This reaction furnishes, according to authoritative analysis, very pure oxygen. The automatic generation of oxygen starts by the turn of a needle-valve, is regulated at any amount of yield, under low, or high pressure, according to requirements, with the same valve, it can be interrupted at any time. The charge of oxone not used remains intact and ready for the next operation. Complete in carrying case with attachment for inhalation, including one tin of oxone which makes 50 gallons of pure oxygen. **Each, $50.00**

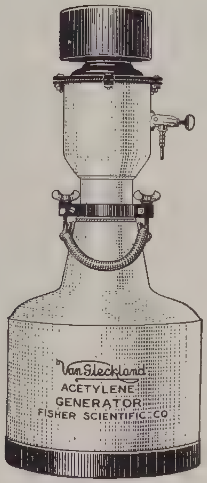
11-205. OXONE. Tins of 6 round cakes (equal to approximately 50 gallons of pure oxygen). To fit No. 11-200 Generator.

Per tin, $3.50
Case of 10 tins, Per tin, $2.10
Case of 50 tins, Per tin, $1.85

GAS GENERATORS



11-210



11-215

11-220

11-210. GAS GENERATOR, Parson, Acid-proof Stoneware, Automatic. Large size for supplying the average laboratory with a continuous supply of hydrogen sulphide, hydrogen, or carbon dioxide.

Consists of an upper reservoir for holding the acid; a tower for the solid reagent and a jar which is filled, about ¾ full, with water. A perforated disc in the tower, holds the solid reagent. Illustration shows the apparatus adjusted for a supply of gas at 6 inches pressure, which pressure is maintained automatically.

Supplied with the necessary glassware, rubber tubing and stoppers to connect the apparatus, and directions for operating. **Each, $50.00**

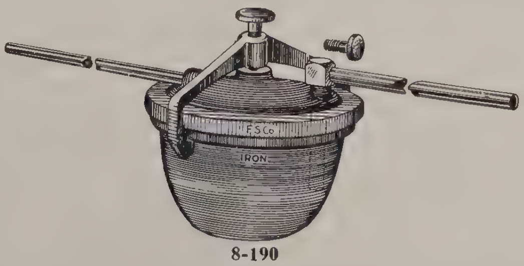
11-215. GAS GENERATOR, Van Gleckland, Acetylene; passed by the National Board of Fire Underwriters. Made of white enameled metal, with lower chamber for water, and upper chamber for carbide.

The operation of the generator is automatic. The carbide is fed to the water by an arrangement which is controlled by the pressure. It has been adjusted to produce and maintain two pounds pressure.

Generator will operate about 10 small acetylene burners. Capacity 5 pounds of carbide.

Each, with 10 lb. can of carbide, **$60.00**

11-220. CARBIDE, of the proper mesh for No. 11-215 Generator; in 10-pound sealed cans...... **Per can, $1.50**

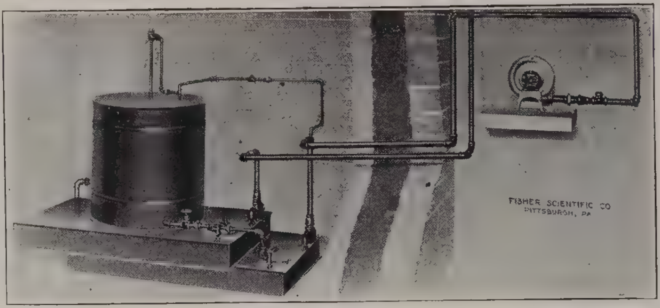


8-190

8-190. GAS GENERATOR, Skidmore. Body made of sheet-iron, spun to shape, with reinforced rim; cast-iron cover with clamp for holding it, and inlet and outlet tubes.

Can be used for the generation of gases by heating substances which do not attack iron, also for destructive distillation. The inlet tube can be closed with the cap supplied, and the generator used as a coking still.

Capacity, ml	45	180
Each, complete	**$1.50**	**2.25**



11-225
See also No. 11-230

11-225. GAS GENERATING MACHINE, with Electric Motor, for making Gasoline Gas. A very economical and satisfactory means of providing an independent gas supply for a laboratory or school building.

Consists of an electric blower; carburetor and mixer; gasoline storage tank; fittings for connecting blower to carburetor; fittings for connecting storage tank to carburetor and fittings for filling.

The tank, which is placed in a vault outside of the building, is made of painted Armco iron, and all fittings are brass, so that the machine is practically rust-proof. The electrically driven motor requires a very small space, and is placed inside the building.

This machine will make about 1000 cu. ft. of gas of a uniform quality, with 5 gallons of 84° to 86° gasoline, commercially known as Gas Machine Gasoline. It is quite simple and can be given the required attention by a Student or Janitor. It is safe and has been approved by the National Board of Fire Underwriters. Complete directions for setting up the machine are supplied with it.

In ordering state the current on which the motor is to be operated.

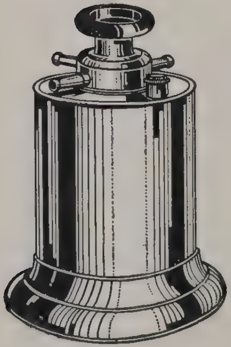
The usual Bunsen Burner consumes from 6 to 12 cubic feet of gas per hour.

Size No.	1	2	3	5	6
Capacity, cu. ft. per hour	100	200	300	500	600
Each	**$300.00**	**375.00**	**510.00**	**630.00**	**720.00**

11-230. GAS GENERATING MACHINE, Weight Type. This machine is similar to No. 11-225 except that the blower is operated by weights instead of by an electric motor.

It consists of a storage tank; compressor with weights; weight pulleys and wire cable; carburetor and mixer, and fittings for connecting compressor to carburetor and carburetor to storage tank. This machine is used where the electric current necessary to operate the No. 11-225 Machine, is not available.

Size No.	1	2	3	5	6
Capacity, cu. ft. per hour	100	200	300	500	600
Each	**$300.00**	**375.00**	**510.00**	**630.00**	**720.00**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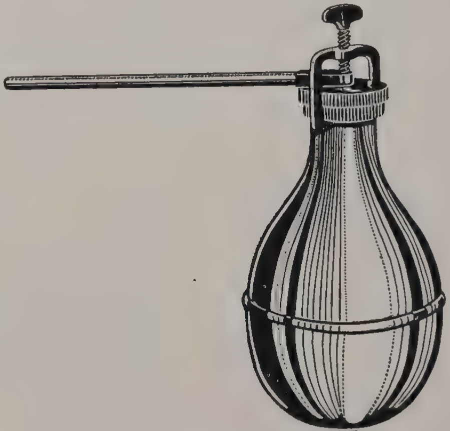
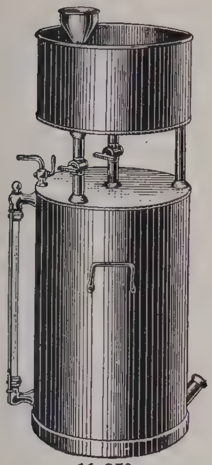

11-240

11-235. GAS GENERATOR, Gasoline. A small and convenient means of generating gasoline gas for a blow pipe, by connecting to a compressed air line with a pressure not greater than one (1) pound per square inch, or a small blower or a foot pump.

Made of copper, nickel plated, with gauze discs to prevent back flashing; with a special control valve on the top, which controls both the gas and the air. Size, 7 inches high by 4½ inches diameter. Capacity, one (1) quart. **Each, $18.00**

11-240. GAS GENERATOR, for generating oxygen. Body made of heavy polished copper with separate cast-iron head and delivery tube, held tightly by means of a screw clamp.

Capacity, ml	250	500	1000
Each	**$3.25**	**3.75**	**4.25**



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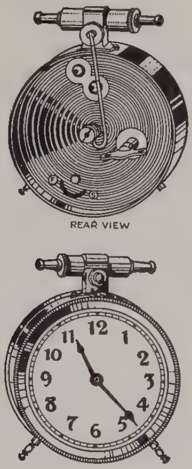

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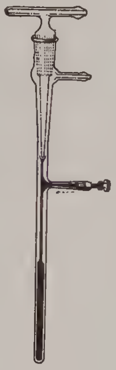

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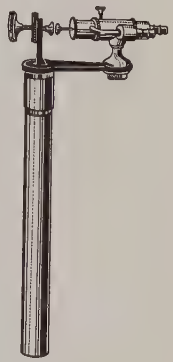


11-265

11-250. GAS HOLDER, Berzelius-Pepy. Made of heavy copper: an improved, portable and compact form. Water is introduced into the holder through the funnel at the top, and as the gas enters through the small stopcock, the water is forced into the open reservoir at the top. The water from this reservoir again displaces the gas as it is withdrawn.

The amount of gas in the holder is observed by a gauge glass on the side.

Capacity, gallons	5	10
Each	**$33.00**	**43.00**

GAS REGULATORS

11-255. GAS REGULATOR, Time Valve. A special clock with an automatically closing gas valve. The valve is inserted between the supply and the apparatus. The valve is set so that the supply of gas to any apparatus, or burner, will be shut off at any time desired. This enables the chemist to give his time and attention to other work or to continue the operation for a certain length of time. **Each, $8.00**

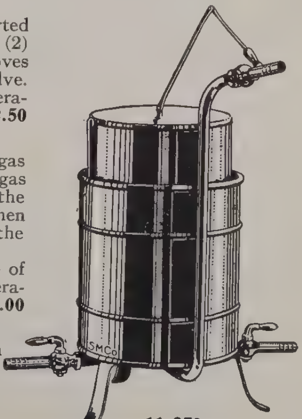
11-260. GAS REGULATOR, Reichert, Temperature. The lower part of the regulator contains mercury, and this part is inserted in the apparatus to be controlled. The mercury is adjusted by means of the screw on the side, so that it closes the entrance tube at the desired temperature. A small hole in the ground joint, with a passage way in the tube, permits some of the gas to by-pass, and keeps the burner lighted until the mercury falls and the supply is again increased. A half-turn of the upper tube, closes the by-pass so that, in this position, it can be used to reach a certain temperature and then shut off the gas completely. Regulator with mercury. **Each, $6.00**

11-265. GAS REGULATOR, Roux, Temperature. The long tube is inserted in the apparatus to be controlled; this contains an arm made of two (2) different metals. As the temperature changes, the top of the arm moves horizontally, and increases or decreases the flow of gas through the valve. A thumb-screw at the top permits this to be adjusted for the temperature desired. Length of Regulator 10 inches. **Each, $12.50**

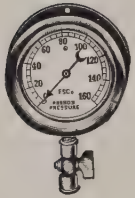
11-270. GAS REGULATOR, Murrill, Pressure, of copper. Consists of a gas chamber with water seal, which rises and falls with the quantity of gas contained. The top of the chamber is connected to the gas valve, and the flow of gas into the chamber is closed when it is filled, and opened when the chamber falls. The gas taken from the chamber is always under the same head, or pressure.

This regulator can be used to supply gas at a uniform pressure of about 5 inches of water, and is often used in connection with temperature regulators, gas meters or calorimeters. **Each, $15.00**

GASOLINE TESTING APPARATUS, see Petroleum and Petroleum Products Testing Apparatus, page 486.



11-270



11-275

11-280

11-285

11-290

11-275. GAUGE, Spring, Pressure; with 3½ inch dial, graduated from zero to 160 pounds in five (5) pound divisions. Gauge has steel case finished in black with brass ring. It has a ¼ inch male pipe connection, and is supplied with a brass stopcock, both ends of which nave female threaded connections. **Each, $4.50**

11-280. GAUGE, Spring, Vacuum; with 5 inch dial, graduated from zero to 30 inches, in one (1) inch divisions. Gauge has iron case finished in black with brass ring. It has a ¼ inch male pipe connection, and is supplied with brass stopcock, both ends of which have female threaded connections. **Each, $5.00**

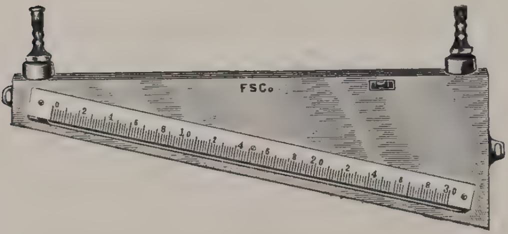
11-285. GAUGE, Draft, 8 inch; for measuring the draft of furnaces and the small pressures or suctions encountered in laboratory experimentation. This gauge is the U tube type, mounted on a metal panel, with a metal guard to protect the glass tubes. The back of the tubing has a red line, which is magnified by the water, making it very easy to read. Zero adjustment of the water column is effected by a small thumbscrew at the bottom of the connecting tube.

The scale is mounted between the two (2) arms of the tube and is graduated for 4 inches, both upward and downward from the center, in tenths of inches, and numbered at each inch. This gives a range of 8 inches of pressure or vacuum.

The gauge is fitted with an eyelet for suspending it from a nail; it has a rubber tubing connection. This connection has a standard pipe thread; it may be removed and the gauge directly connected to the flue, etc., by means of permanent piping. **Each, $10.00**

11-290. GAUGE, Vacuum, without Mercury, (Manometer) Bennert; with stopcock and movable scale engraved on milk glass plate. Scale is graduated above and below zero from zero to 120 mm., subdivided in one (1) mm. divisions and numbered every cm. The glass part is mounted on a finished, hardwood support. Gauge is supplied without mercury, on account of the inability to ship gauges with mercury, without a large percentage of breakage and separation of the mercury column. **Each, $12.50**

GAUGE, McLeod, for High Vacuum, see No. 1-170, page 10.



11-295

11-305

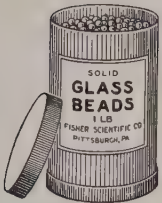
11-295. GAUGE, Differential, Draft; for very accurately indicating draft in flues. The gauge is made with closed front, thus protecting the glass parts from breakage. The frame is made of polished aluminum. This gauge is made with slotted lugs on the sides for mounting the instrument, and to facilitate leveling the gauge before finally fastening it. The connections are shaped to take rubber tubing, and have ⅛ inch I. P. threads so that the gauge can also be connected with metal piping. The oil supplied with the gauge is colored deep red, making the instrument easily read. Instrument has a scale 15 inches long (which has a **5-to-1** ratio) and indicates 3 inches of pressure; it is graduated to 3 inches in 1/50 inch subdivisions.

Supplied with bottle of oil, one (1) foot of 5/16 inch tubing, and glass funnel for filling. **Each, $18.00**

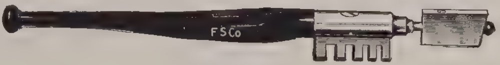
11-300. GAUGE OIL, Red, for use with No. 11-295 Gauge.............................**Per 6 oz. bottle, $.80**

11-305. GAUGE, Wire. The American Standard Gauge, with B. & S. numbers zero to 36 on one (1) side, and the decimal equivalent in inches on the other side. Made of hardened steel, tested after hardening; finished in black. **Each, $3.50**

GERMINATION APPARATUS, see Plant Physiology Apparatus, pages 78 and 79.

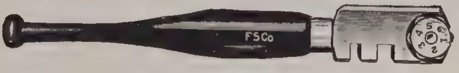


11-310



11-315

11-320



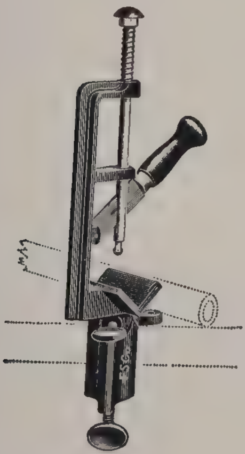
11-325

11-310. GLASS BEADS, solid; for increasing the absorption area in different gas apparatus. The diameter of these beads varies from 3 to 6 mm. **Per pound, $2.30**

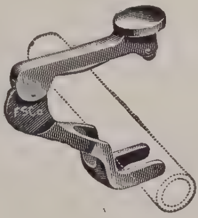
11-315. GLASS CUTTER, Glazier's Diamond; for cutting glass plates. Metal parts are of brass with nickel-plated finish, mounted in ebony handle. Diamond can be reset a number of times. Equipped with rack for single and double thick glass. **Each, $6.00**

11-320. GLASS CUTTER, for cutting glass plates. It has a steel wheel, red enameled handle, and polished head. For extra cutting wheels, see No. 11-345. **Each, $ .20**

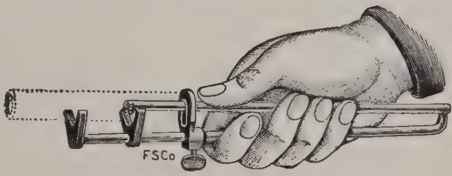
11-325. GLASS CUTTER, with six (6) steel wheels in a turret head. When a wheel becomes dull, loosen the screw in head and turn turret around to bring a sharp wheel into position for use. For extra cutting wheels, see No. 11-345. **Each, $ .60**



11-330



11-340



11-335

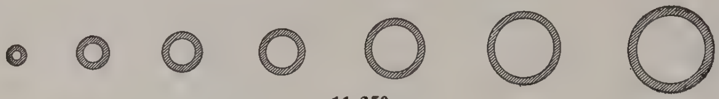
11-330. GLASS CUTTER, for tubing. It can be attached to table. This cutter nas a steel wheel, and by pressing the handle, the wheel is brought down on the part of the tubing which is to be cut. It is evenly cut by revolving the tubing, and will take tubing from 3/16 to 1½ inches. For extra cutting wheels, see No. 11-345. **Each, $7.25**

11-335. GLASS CUTTER, for tubing. It cuts tubing from the inside. The tube is held in fibre rests so that the cutting wheel makes a perfect circle when turning the tube. Glass Cutter has an adjustable stop, used for gauging the length of the cut portion of the tube. Overall length, 12 inches; cuts pieces of tubing up to 8 inches long, which can be from ⅜ to one (1) inch inside diameter. For extra cutting wheels, see No. 11-345. **Each, $1.70**

11-340. GLASS CUTTER, for Tubing, Griffin. Made of brass, nickel-plated, fitted with spring to keep it open and ready for use. It will cut tubing up to 30 mm. The cutter is held by the thumb and forefinger and turned around the glass tube. For extra cutting wheels, see No. 11-345. **Each, $1.00**

11-345. CUTTING WHEELS, for use with Glass Cutters, No. 11-320, No. 11-325, No. 11-330, No. 11-335, and No. 11-340. **Each, $ .10**
Per dozen, $1.00

GLASS TUBING AND RODS



11-350
Actual sizes

11-355

11-360

REGARDING SIZES AND PACKING

Our glass tubing is machine-drawn and is much more uniform in size and thickness of wall than hand-drawn tubing. It is, however, impossible to make glass tubing with the uniformity that one is accustomed to in metal tubing. The tubing is gauged and assorted for size within tolerances in keeping with the process of manufacture. The tolerances allowed for glass tubing and rod are as follows:

Outside diameter, mm.	**3 to 9**	**10 to 16**	**19 to 30**	**30 to 50**
Tolerance (+ or −), mm.	**½**	**1**	**1½**	**2**

SPECIAL SELECTION to size, within tolerances smaller than these, will be made only when "special selection" is specified, in which case an extra charge will be made.

PACKING

Glass Tubing No. 11-350 and Rod No. 11-375 come in five (5) foot lengths; this is the longest length that we have in stock. On orders of 3 pounds or more, we will supply 5-foot lengths, and pack in a separate case. The prices given for tubing and rod do not include cases and packing, and an extra charge is made when it is packed in a separate case.

Where sizes under 10 mm. are shipped in small quantities (less than 3 lbs.) along with other material, we endeavor to avoid the expense of a separate case, by cutting the 5-foot lengths in half and packing them in the same case with the other material, where possible to do so. If small quantities are ordered along with other material, and 5-foot lengths are desired, it should be so specified; in which case, the full lengths will be packed in a separate case.

11-350. GLASS TUBING. Free from lead; for making connections, and for glass blowing, bending, etc. The sizes listed are selected with the tolerances mentioned above. Glass tubing cases are charged extra; see "Regarding Sizes and Packing" in the introduction to this section. The dimensions given refer to the **outside diameter.**

Outside diameter, mm	3	5	6	7	9	11	13	16
Thickness of wall, mm	¾	¾	1	1	1	1	1¼	1¼
Feet to pound (approximate)	75	59	38	31	23	19	17	13
Per pound	**$1.10**	**.75**	**.75**	**65**	**.60**	**.60**	**.55**	**.50**
Outside diameter, mm		19	22	25	28	32	38	50
Thickness of wall, mm		1¼	1½	1½	1½	2	2	2½
Feet to pound (approximate)		11	6	5	4	3	2	1
Per pound		**$ .50**	**.55**	**.55**	**.60**	**.65**	**.75**	**.85**

25-lb. lots of a size, 10% discount. **100-lb. lots of a size,** 20% discount. (Cases are charged extra.)

11-355. GLASS TUBING, Barometer; heavy wall, lead-free lime glass. For smaller diameters, see Capillary Tubing No. 11-360. The standard length is five (5) feet; if cut and packed with other material, the case charge is avoided.

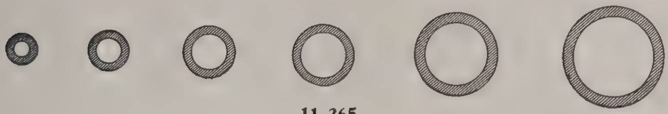
Outside diameter, mm	9	11
Inside diameter, mm	3	4
Per pound	**$1.15**	**1.15**

25-lb. lots of a size, 10% discount. (Cases are charged extra.)

11-360. GLASS TUBING, Capillary; of lead-free lime glass. The standard length is five (5) feet; if cut and packed with other material, the case charge is avoided.

Outside diameter, mm	5	6½
Inside diameter, mm	1	1½
Per pound	**$1.15**	**1.15**

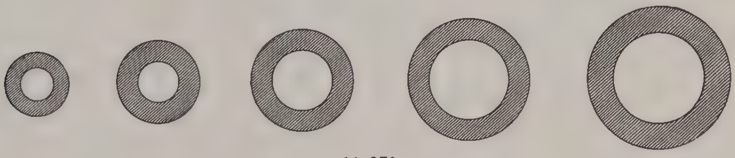
25-lb. lots of a size, 10% discount. (Cases are charged extra.)



11-365

Pyrex
Standard Wall

Pyrex
Combustion



11-370

11-365. GLASS TUBING, Pyrex, Standard Wall; the same composition that is used in making Pyrex flasks and beakers. It has a high softening point, low coefficient of expansion and great mechanical strength. This thickness of wall is used for making apparatus connections, etc. The small sizes can be bent after heating over a blast burner, using gas and compressed air. To make other conformations, and to bend the large sizes, oxygen must be used in the burner in place of compressed air.

The tubing is assorted according to size, as listed; on account of the difficulties in drawing this hard glass tubing, smaller variations than the tolerances given are impracticable. This tubing is supplied in the **standard lengths of 36 inches;** prices do not include cases.

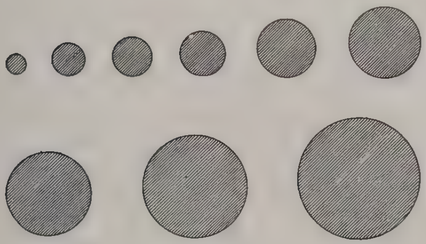
Outside diameter, inches	$\frac{3}{16}$	¼	$\frac{5}{16}$	⅜	½	⅝	¾	⅞	1	1¼	1½	2
Outside diameter, mm	4.8	6.4	7.9	9.5	12.7	16	19	22	25	32	38	50
Approx. wall thickness, mm	.8	1	1	1.2	1.6	1.6	1.6	2	2	2.4	2.4	2.4
Tolerance, O.D., mm. + or −	1.0	1.2	1.2	1.2	1.6	1.6	1.6	2	2	2.4	2.7	3.1
Feet to pound (approximate)	65	48	27	21	12	9	6	5	4	3	2½	2
Per pound	**$1.50**	**1.35**	**1.35**	**1.20**	**1.35**	**1.35**	**1.35**	**1.50**	**1.50**	**1.65**	**2.15**	**2.50**

25-lb. lots of a size, 10% discount. (Cases are charged extra.)

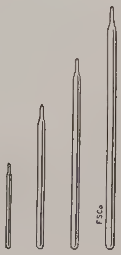
11-370. GLASS TUBING, Combustion, Pyrex. This is the same quality of glass as the No. 11-365 Tubing, but is drawn with a heavier wall. It can be used successfully for combustions provided the temperature is not higher than 750° C. *Where temperatures higher than 750° C. are encountered, we suggest the use of silica tubes.* Supplied in **36-inch lengths.**

Outside diameter, mm	10	13	16	19	22	25
Approx. wall thickness, mm	2.4	3.2	3.2	3.2	4	4
Tolerance, O.D., mm. + or −	1.2	1.6	1.6	1.6	2	2
Per pound	**$1.65**	**1.80**	**1.80**	**1.80**	**1.95**	**1.95**

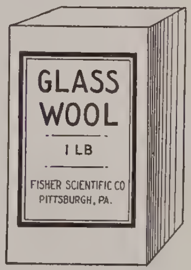
25-lb. lots of a size, 10% discount. (Cases are charged extra.)



11-375 **See also No. 11-385**



11-380



11-390

11-375. GLASS ROD. Lead-free lime glass; suitable for making stirring rods, bending, etc. In standard 5-foot lengths; see "Regarding Sizes and Packing" in introduction to this section.

Diameter, mm	3	5	6	7	9	11	13	16	19
Per pound	**$ .80**	**.70**	**.60**	**.60**	**.50**	**.50**	**.50**	**.70**	**.70**

25-lb. lots of a size, 10% discount. (Cases are charged extra.)

11-380. GLASS STIRRING RODS. One end rounded, the other end pointed.

Length, mm	125	150	200	250
Diameter, mm	3	5	5	6½
Per dozen	**$ .40**	**.50**	**.60**	**.75**

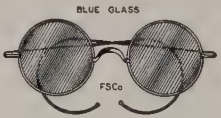
11-385. GLASS ROD, Sealing. Soft glass, made especially for sealing platinum terminals in glass. Sometimes called "sealing-in" glass. Diameter of rod, $\frac{3}{16}$ inch. **Per ¼ pound, $ .75**
Per pound, $2.00

11-390. GLASS WOOL. Made of spun glass; used for filtering, etc. ....**Per ounce pkg., $ .30**
Per 4-ounce pkg., $ .90. **Per pound pkg., $1.80**

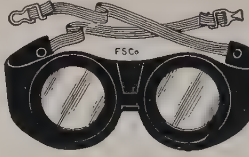
GLOVES, Rubber, see Rubber Gloves, page 513.

Glue

11-395



11-400



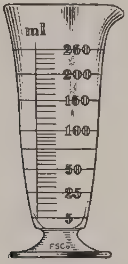
11-405

11-395. GLUE, Le Page's. Liquid form; for general gluing and repairing........................**Per pint, $1.00**

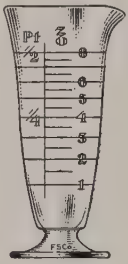
11-400. GOGGLES, Blue Glass. The entire frame is made of a white metal with twisted flexible wire fitting around the ears. The lenses are blue for protecting the eyes when looking into hot furnaces, etc. **Each, $ .80**

11-405. GOGGLES, Protecting. Made of rubber with reinforced nosepiece and adjustable elastic headband. Fitted with round clear glass lenses 55 mm. diameter, which are removable and easily cleaned. It is gas-tight, fits the face closely, and allows full vision.

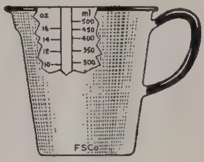
These goggles will protect the eyes from dust, smoke, chemical powders, or chemical fumes. **Each, $1.00**



11-410



11-415



11-420

11-410. GRADUATES, Metric. Government Standard Shape, with etched graduations.

Capacity, ml	30	60	125	250	500	1000
Each	**$ .55**	**.60**	**.80**	**1.00**	**1.60**	**2.95**

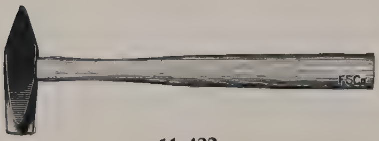
11-415. GRADUATES, Apothecaries Measure. Government Standard Shape, with etched graduations.

Capacity, ounces	1	2	4	8	16	32
Each	**$ .50**	**.55**	**.70**	**.85**	**1.40**	**2.45**

GRADUATES, Cylindrical, see Graduated Cylinders No. 8-550 to No. 8-565, page 285.

11-420. GRADUATES, White Enameled. Made of seamless steel, with blue enameled rim and handle. Graduated on the inside, in milliliters and ounces.

Capacity, ounces	500	1000
Capacity, ml	16	32
Each	**$1.70**	**2.20**



11-422

11-424

HAEMACYTOMETERS and other Blood Testing Apparatus, see Clinical Diagnostic Apparatus.

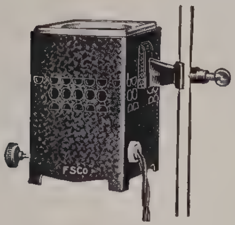
11-422. HAMMERS, Wedge Shape; for breaking ores. Made of special steel carefully forged, hardened and tempered. Handle is made of selected white hickory.

Weight, ounces	7	15
Each	**$1.40**	**1.65**

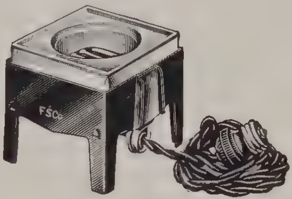
11-424. HAMMER (Pick), Prospector's; with forged steel head 8 inches long; one end of which is square with a flat face. The other end has a pick point. Handle is about 12 inches long and is made of selected white hickory. Weight, 1½ pounds. **Each, $2.70**

HARDNESS TESTING APPARATUS, see Metallurgical Testing Apparatus, pages 432 to 434.

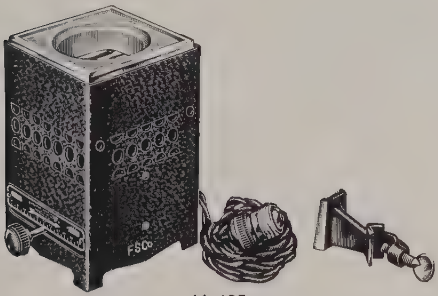
HEATERS AND HOT PLATES



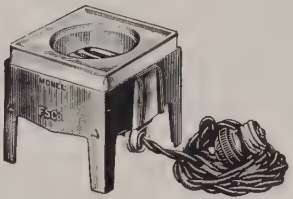
No. 11-425 Heater mounted on support rod



11-428



11-425



11-430

11-425. HEATER, Precision Electric, with Rheostat. This heater consists of a coil of resistance wire wound on a refractory support and controlled by a rheostat. Both coil and rheostat are mounted in a crystal lacquered case. It can be used for the distillation of both low-boiling and high-boiling liquids.

The heating element is a coil of "Chromel A," a non-resisting, base-metal alloy which is 80% nickel and 20% chromium. This is wound backward and forward across a refractory support. The terminals, which extend through the base of the heater, are Monel Metal; this avoids oxidation of the connecting wires. Above this is another refractory which serves as a support for flasks, beakers, etc., which has a central hole 75 mm. (3 inches) in diameter and will accommodate both the 500 and 800 ml. Kjeldahl flasks, and will readily take other shapes as well. Supports with other sized openings, No. 11-450, No. 11-455, or No. 11-460 with holes 1½, 1¼, and one (1) inch diameter, to be used in the distillation of kerosene, gasoline, and benzol, can also be used in this heater. At full load this heater draws 5 amperes at 110 volts.

The rheostat consists of two (2) parallel resistance coils, over which a sliding contact is moved by means of a rack and pinion actuated by a knob projecting through the front of the heater and moving over a graduated scale. After the proper heat for a particular operation has been determined, it can always be duplicated by adjusting the rheostat to the same scale reading.

At the rear of the case is a removable clamp. The entire heater can be attached to an apparatus support. (*See illustration.*) The heater is 5 x 5 x 7 inches high, and is standardized throughout. The connecting cord is a special one with asbestos insulation.

Supplied with upper refractory with 75 mm. opening, clamp, and cord with Bakelite plug for direct connection to laboratory lighting circuit. Made for use on either 110-volt current or 220-volt current. **State voltage when ordering.**

A. For 110 volts, **Each, $13.50**
B. For 220 volts, **Each, $13.50**

(*For extra heating units, see No. 11-435.*)

11-428. HEATER, Precision Electric, Single Heat. The heating element is "Chromel A" wound on a refractory support, draws 550 watts, and is the same as that used with the No. 11-425 Electric Heater. It has a separate refractory top with a 75 mm. opening, and is mounted in a black lacquered iron case which has four (4) legs, and has a clamp bracket so that No. 11-438 Clamp can be attached, if desired.

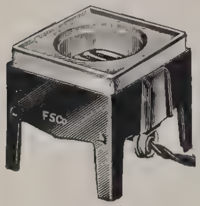
Heater with asbestos insulated cord and Bakelite plug for direct connection to laboratory lighting circuit. Made for use on either 110-volt current, or 220-volt current. **State voltage when ordering.**

A. For 110 volts, **Each, $6.00**
B. For 220 volts, **Each, $6.00**

11-430. HEATER, Precision Electric, with Monel Metal Case. This heater is the same as No. 11-428, excepting that the case with legs is made of Monel Metal, which is rust-proof, acid-resistant, and is not affected by the usual laboratory fumes. Supplied with asbestos insulated cord and Bakelite plug. **State voltage when ordering.**

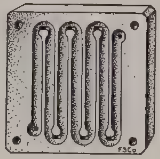
A. For 110 volts, **Each, $7.50**
B. For 220 volts, **Each, $7.50**

Heaters and Hot Plates

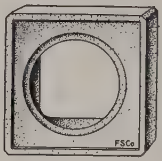


11-433

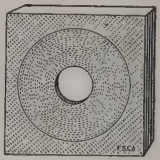
11-438



11-440



11-445



11-450

See also No. 11-455 and No. 11-460

11-433. HEATER, Precision Electric. Similar in every way to No. 11-428 Heater with lacquered iron case, but is supplied **without cord or plug,** for group installation in connection with Kjeldahl digestions, distillation banks, etc. **State voltage when ordering.**
A. For 110 volts, **Each, $5.00**
B. For 220 volts, **Each, $5.00**

11-435. HEATING UNIT, Coiled Wire only; for replacement in Precision Heaters. These elements can be quickly installed by the operator. **State voltage when ordering.**
A. For 110 volts, **Each, $1.00**
B. For 220 volts, **Each, $1.00**

11-438. CLAMP, for use with No. 11-428, No. 11-430, or No. 11-433 Heaters. Fits in the bracket on the metal case of the heater, and supports a rod or can be attached to the rod of an apparatus support. **Each, $ .90**

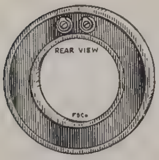
11-440. REFRACTORY, Lower; for Precision Electric Heaters. This has grooves to take the No. 11-435 Coiled Heating Unit. Refractory only. **Each, $1.50**

11-445. REFRACTORY, Upper; for Precision Electric Heaters, with opening 75 mm. (3 inches) in diameter; used for general heating. **Each, $1.25**

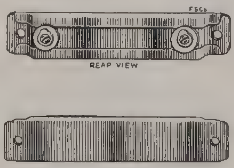
11-450. ASBESTOS TOP, for Precision Electric Heaters. Made of asbestos composition, ¾ inch thick, with countersunk opening 38 mm. (1½ inches) in diameter; used for the distillation of **kerosene and turpentine.** **Each, $1.50**

11-455. ASBESTOS TOP, for Precision Electric Heaters. Similar to No. 11-450, but with opening 32 mm. (1¼ inches) in diameter; used for the distillation of **gasoline.** **Each, $1.50**

11-460. ASBESTOS TOP, for Precision Electric Heaters. Similar to No. 11-450, but with opening 25 mm. (1 inch) in diameter; used for the distillation of **benzol.** **Each, $1.50**



11-462



11-463

11-465

11-462. HEATER, Chromel-Ascoloy, Ring. For general use in heating apparatus around the laboratory. This heater has a "Chromel A" heating element embedded in high temperature insulation, and surrounded by a sheath of **Ascoloy**—a high temperature, chemical resistant, stainless iron alloy. These heaters can be operated continuously at temperatures up to 1400° F., and have a very long life. For use on **110-volt current,** unless otherwise specified.

Size	A	B	C	D
Outside diameter, inches	4	4	5½	5½
Inside diameter, inches	1½	1½	3	3
Watts	250	500	250	500
Each	$4.75	6.75	5.50	7.50

Heaters for 220 volts can be supplied to order, at the same price. Other sizes and capacities are made to order.

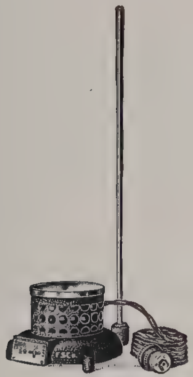
11-463. HEATER, Chromel-Ascoloy, Straight. This heater is similar in construction to the No. 11-462 Ring Heater, but is long and narrow instead of circular. It finds particular use in the construction of hot plates, heater banks, etc. They can be used singly or two or more can be connected in parallel for heating larger apparatus. For use on **110-volt current** unless otherwise specified.

Size	A	B	C
Length, inches	8	12	12
Width, inches	1½	1½	1½
Watts	150	250	500
Each	$4.50	5.50	7.50

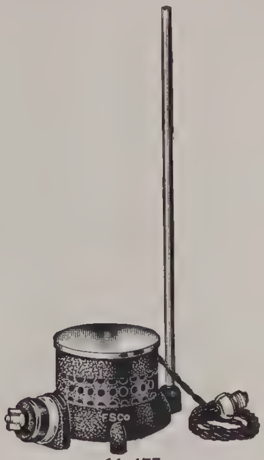
Heaters for 220 volts can be supplied to order, at the same price. Other sizes and capacities are made to order.

11-465. HEATER, Electric, Three Heat; for distillations, extractions, etc. These heaters have a disc-shaped, cast-iron top with a pressed-steel, nickel-plated base. The 6-inch size is supplied with a cord and plug for direct connection to the lighting circuit of the laboratory, while the 8-inch size does not have a plug because it should be directly connected to a main line. These heaters can be supplied for either 110-volt or 220-volt current. **When ordering state voltage.**

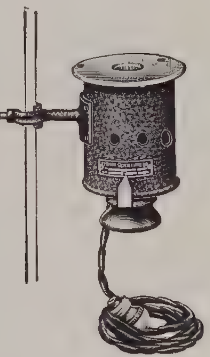
Diameter of hot-plate, inches	6	8
Current consumption (low), watts	150	235
Current consumption (medium), watts	300	475
Current consumption (high), watts	600	950
A. For 110 volts, **Each**	$9.25	15.00
B. For 220 volts, **Each**	$9.25	15.00



11-470



11-475



11-480

11-470. HEATER, Electric, Single Heat, 4 inches. This heater has a cast-iron base and a steel top, with a replaceable heating element of Nichrome ribbon embedded in refractory cement. The heater terminals are Monel Metal. The top is 4 inches diameter. An apparatus support rod 20 inches high is screwed into the base at the rear. Heater consumes about 300 watts, and is provided with a trip switch, asbestos insulated cord and plug for attaching directly to the lighting circuit. **State voltage when ordering.**
A. For 110 volts, **Each, $9.50**
B. For 220 volts, **Each, $9.50**

11-472. HEATING UNITS, for No. 11-470 Heater.................................**A.** For 110 volts, **Each, $4.00**
B. For 220 volts, **Each, $4.00**

11-475. HEATER, Electric, Three Heat, 6 inches. This heater is similar to the No. 11-470 Heater, but is much larger and has a snap switch for regulating the current for low, medium, and full heats. There are two (2) separate heating elements of Nichrome wire, beneath the steel plate; either of these can be readily replaced. Diameter of hot-plate, 6 inches; height of apparatus support rod, about 24 inches; maximum current consumption, 660 watts. **State voltage when ordering.** **A.** For 110 volts, **Each, $12.50**
B. For 220 volts, **Each, $12.50**

11-477. HEATING UNITS, for No. 11-475 Heater. Two (2) of these units are required for complete replacement. Either heating unit can be replaced independently of the other one. **A.** For 110 volts, **Each, $4.00**
If one unit is desired, specify whether outer or inner. **B.** For 220 volts, **Each, $4.00**

11-480. HEATER, Electric, with Rheostat, 110 volts; for the distillation of gasoline and similar inflammable liquids. This heater is designed primarily for the distillation of benzol, gasoline, turpentine and other low-boiling liquids. The heater has a coiled Nichrome heating unit, partially embedded in a refractory cement. This gives a concentrated heat, but due to the relatively small amount of wire actually embedded, the heater responds rapidly to changes in the quantity of current passing through. The refractory and wire can be readily replaced by the operator. A rheostat mounted in the bottom of the case controls the temperature. The case is finished in black crystallized lacquer which is not attacked by acid fumes. Heater is fitted with a screw clamp for attaching directly to an apparatus support and has a 1¼-inch opening at the top. Heater for use on **110-volt** current only. **Each, $14.00**

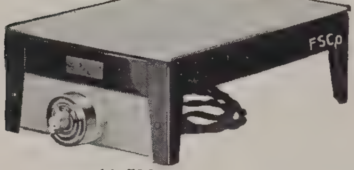
NOTE. This heater is not intended for the distillation of kerosene or other high-boiling liquids. For heaters for such purposes, see No. 11-425.

11-485. HEATER, Electric, with Rheostat, 220 volts; for the distillation of gasoline and similar inflammable liquids. This heater is the same as No. 11-480 Heater, but is designed for use on **220-volt** current only.
Each, $15.00

11-490. HEATER, Electric, Single Heat, Rectangular, Hoskins. This heater has a steel top 12 x 12 inches, with aluminum finish; it has cast-iron legs. The heating unit is a circular block fastened to the underside of the top-plate, and can be readily replaced. The maximum temperature is about 650° F. at the center; by placing articles on the plate at different distances from the center, they can be heated at temperatures ranging from 650° to 250° F. Current consumption, 500 watts. Heater can be supplied for either 110-volt or 220-volt current. **State voltage when ordering.**
A. For 110 volts, **Each, $14.00**
B. For 220 volts, **Each, $14.00**

11-490

11-495. HEATING ELEMENT, for No. 11-490 Rectangular Electric Heater; complete, ready to install. **State voltage when ordering.**
A. For 110 volts, **Each, $3.25**
B. For 220 volts, **Each, $3.25**



11-500 Size 12x18

11-500 Size 18x24

11-500. HEATERS, Electric, Three Heat, Rectangular, Hoskins; with steel tops and iron legs, and have replaceable heating units. The heating unit is composed of three (3) parallel windings which are separately controlled by a single switch on the No. 120 and No. 121 sizes, and by three (3) separate switches on the No. 122 size. Temperatures of 475° F., 600° F., or 750° F. can thus be obtained. These heaters are supplied with 6 feet of flexible cord. **State voltage when ordering.**

Size, No.	120	121	122
Maximum current consumption, watts	1200	1800	3600
Size, inches	12 x 12	12 x 18	18 x 24
A. For 110 volts, **Each**	**$37.50**	**50.00**	**70.00**
B. For 220 volts, **Each**	**$37.50**	**50.00**	**70.00**

11-505. HEATING UNITS, for No. 11-500 Electric Heaters. These units can be readily replaced by the operator. **State voltage when ordering.**

For size, No.	120	121	122
A. For 110 volts, **Each**	**$9.00**	**10.00**	**20.00**
B. For 220 volts, **Each**	**$9.00**	**10.00**	**20.00**

HEATERS, for Extraction Apparatus, see No. 9-665 to No. 9-680.
HOT PLATES, Gas Heated, see page 125.
HYDROGEN ION DETERMINATION APPARATUS, see Clinical Diagnostic Apparatus, Colorimeters and Electro-Chemical Apparatus.

HYDROMETERS

DEGREES BEAUME (American)—SPECIFIC GRAVITY CONVERSION TABLE At 60° F. (15.55° C.)

For liquids **heavier than water** Degrees Beaume $= 145 - \frac{145}{\text{Sp. Gr.}}$

°Be.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°
0	1.000	1.007	1.014	1.021	1.028	1.036	1.043	1.051	1.058	1.066
10	1.074	1.082	1.090	1.098	1.107	1.115	1.124	1.133	1.142	1.151
20	1.160	1.169	1.179	1.188	1.198	1.208	1.218	1.229	1.239	1.250
30	1.261	1.272	1.283	1.295	1.306	1.318	1.330	1.343	1.355	1.368
40	1.381	1.394	1.408	1.422	1.436	1.450	1.465	1.480	1.495	1.510
50	1.526	1.543	1.559	1.576	1.593	1.611	1.629	1.648	1.667	1.686
60	1.706	1.726	1.747	1.768	1.790	1.812	1.835	1.859	1.883	1.908

For liquids **lighter than water,** Degrees Beaume $= \frac{140}{\text{Sp. Gr.}} - 130$

°Be.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°
10	1.000	0.993	0.986	0.979	0.972	0.966	0.959	0.952	0.946	0.940
20	0.933	0.927	0.921	0.915	0.909	0.903	0.897	0.892	0.886	0.880
30	0.875	0.870	0.864	0.859	0.854	0.848	0.843	0.838	0.833	0.828
40	0.824	0.819	0.814	0.809	0.804	0.800	0.795	0.791	0.786	0.782
50	0.778	0.773	0.769	0.765	0.761	0.757	0.753	0.749	0.745	0.741
60	0.737	0.733	0.729	0.725	0.722	0.718	0.714	0.711	0.707	0.704
70	0.700	0.696	0.693	0.690	0.686	0.683	0.680	0.676	0.673	0.670
80	0.667	0.664	0.660	0.657	0.654	0.651	0.648	0.645	0.642	0.639
90	0.636	0.633	0.631	0.628	0.625	0.622	0.619	0.617	0.614	0.611

11-515
See Conversion Table on page 406

REGARDING HYDROMETER SCALES

The Hydrometers listed in this catalogue, unless otherwise specified, are graduated on the basis of 60° F., and the scales are handwritten as this is the only method of making the scales which will give accurate readings. These Hydrometers should not be confused with those having printed scales which are more quickly made but are not so accurate.

The Specific Gravity - Beaume Conversion Table on page 406 will facilitate the interpretation of readings obtained in one system, in terms of the other system.

11-510. HYDROMETERS, Specific Gravity; for liquids **lighter** than water. Approximate total length, 12 inches.

Range	A	B	C	D
Scale, Sp. Gr	0.700–0.800	0.800–0.900	0.900–1.000	0.700–1.000
Subdivisions	.001	.001	.001	.005
Each	**$1.50**	**1.50**	**1.50**	**1.50**

Dozen lots, 10% discount.

11-515. THERMO-HYDROMETERS, Specific Gravity; for liquids **lighter** than water; scale 0.700–1.000 graduated to .005; with a thermometer enclosed in the hydrometer. Approximate total length, 15 inches. **Each, $3.75**

11-520. HYDROMETERS, Specific Gravity; for liquids **heavier** than water. Approximate total length, 12 inches.

Range	A	B	C
Scale, Sp. Gr	1.000–1.200	1.200–1.400	1.400–1.600
Subdivisions	.002	.002	.002
Each	**$1.50**	**1.50**	**1.50**

Dozen lots, 10% discount.

Range	D	E	F
Scale, Sp. Gr	1.600–1.800	1.800–2.000	1.000-2.000
Subdivisions	.002	.002	.010
Each	**$1.50**	**1.50**	**1.50**

Dozen lots, 10% discount.

11-525. THERMO-HYDROMETER, Specific Gravity; for liquids **heavier** than water; scale 1.000 to 2.000 graduated to .010; with a thermometer enclosed in the hydrometer. Approximate total length, 15 inches. **Each, $3.75**

11-530. HYDROMETERS, Specific Gravity and Beaume Scales; for liquids **lighter** than water. Approximate total length, 12 inches.

Range	A	B	C
Scale, Sp. Gr	0.700–0.850	0.850–1.000	0.700–1.000
Subdivisions	.002	.002	.005
Scale, Beaume	70–35	35–10	70–10
Subdivisions, degrees	½	½	1
Each	**$1.75**	**1.75**	**1.75**

Dozen lots, 10% discount.

11-535. THERMO-HYDROMETER, Specific Gravity and Beaume Scales; for liquids **lighter** than water. Specific Gravity scale 0.700 to 1.000, subdivisions .005. Beaume scale 70° to 10°, subdivisions 1°; **with a thermometer** enclosed in the hydrometer. Approximate total length, 15 inches. **Each, $4.50**

11-540. HYDROMETERS, Specific Gravity and Beaume Scales; for liquids **heavier** than water. Approximate total length, 12 inches.

Range	A	B	C
Scale, Sp. Gr	1.000–1.200	1.200–1.400	1.400–1.600
Subdivisions	.002	.002	.002
Scale, Beaume	0–24	24–41	41–54
Subdivisions, degrees	⅕	⅕	⅕
Each	**$1.75**	**1.75**	**1.75**

Dozen lots, 10% discount.

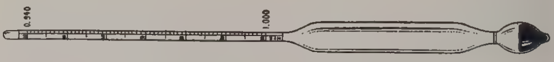
Range	D	E	F
Scale, Sp. Gr	1.600–1.800	1.800–2.000	1.000–2.000
Subdivisions	.002	.002	.010
Scale, Beaume	54–64	64–70	0–70
Subdivisions, degrees	⅕	⅕	1
Each	**$1.75**	**1.75**	**1.75**

Dozen lots, 10% discount.

Hydrometers

11-550

See Conversion Table
on page 406



11-555

11-545. THERMO-HYDROMETER, Specific Gravity and Beaume Scales; for liquids **heavier** than water. Specific Gravity scale 1.000 to 2.000, subdivisions .010. Beaume scale 0° to 70°, subdivisions 1°; with a thermometer enclosed in the hydrometer. Approximate total length, 15 inches. **Each, $4.50**

11-550. HYDROMETER, Specific Gravity, Universal; with a Specific Gravity scale for both **light** and **heavy** liquids. Range 0.700 to 2.000. Approximate total length, 13½ inches. **Each, $1.50**

11-555. HYDROMETERS, Precision, Specific Gravity. Used for the most accurate Specific Gravity determinations by means of a hydrometer. There are nineteen different hydrometers, each one of which has a range of 0.060, hence the subdivisions of 0.001 are easily read. The approximate total length is 13 inches.

No.	1	2	3	4
Scale, Sp. Gr.	0.700–0.760	0.760–0.820	0.820–0.880	0.880–0.940
Each	**$3.00**	**3.00**	**3.00**	**3.00**
No.	5	6	7	8
Scale, Sp. Gr.	0.940–1.000	1.000–1.060	1.060–1.120	1.120–1.180
Each	**$3.00**	**3.00**	**3.00**	**3.00**
No.	9	10	11	12
Scale, Sp. Gr.	1.180–1.240	1.240–1.300	1.300–1.360	1.360–1.420
Each	**$3.00**	**3.00**	**3.00**	**3.00**
No.	13	14	15	16
Scale, Sp. Gr.	1.420–1.480	1.480–1.540	1.540–1.600	1.600–1.660
Each	**$3.00**	**3.00**	**3.00**	**3.00**
No.		17	18	19
Scale, Sp. Gr.		1.660–1.720	1.720–1.780	1.780–1.850
Each		**$3.00**	**3.00**	**3.00**

11-560. HYDROMETERS, Beaume; for liquids **lighter** than water. Approximate total length, 12 inches.

Range	A	B	C	D	E	F
Scale, Beaume	30–10	50–30	70–50	90–70	70–10	90–10
Subdivisions, degrees	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	1	1
Each	**$1.75**	**1.75**	**1.75**	**1.75**	**1.25**	**1.50**

Dozen lots, 10% discount.

11-565. THERMO-HYDROMETERS, Beaume Scale; for liquids **lighter** than water; with a thermometer enclosed in each hydrometer. Approximate total length, 15 inches.

Range	A	B	C	D	E	F
Scale, Beaume	30–10	50–30	70–50	90–70	70–10	90–10
Subdivisions	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	1	1
Each	**$4.50**	**4.50**	**4.50**	**4.50**	**4.00**	**4.25**

11-570. HYDROMETERS, Beaume; for liquids **heavier** than water. Approximate total length, 12 inches.

Range	A	B	C	D
Scale, Beaume	0–15	15–30	30–50	50–70
Subdivisions	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each	**$1.75**	**1.75**	**1.75**	**1.75**

Dozen lots, 10% discount.

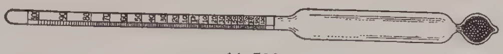
11-575. THERMO-HYDROMETERS, Beaume; for liquids **heavier** than water; with a thermometer enclosed in each hydrometer. Approximate total length, 15 inches.

Range	A	B	C	D	E
Scale, Beaume	0–15	15–30	30–50	50–70	0–70
Subdivisions	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	1
Each	**$4.50**	**4.50**	**4.50**	**4.50**	**4.00**

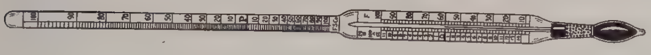
11-580. HYDROMETERS, Beaume; for liquids **heavier** than water; with printed scale; used where the closer readings of No. 11-575 Hydrometers are not required. Approximate total length, 12 inches.

Range	A	B
Scale, Beaume	0–50	0–70
Subdivisions	1	1
Each	**$1.00**	**1.00**

Dozen lots, 10% discount.



11-590



11-595

See Conversion Table
on page 406

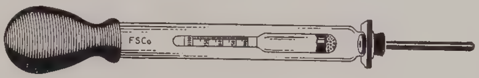
11-585. HYDROMETERS, Twaddle; for liquids **heavier** than water. The degrees marked on the scale, multiplied by five (5) and added to 1.000 give the Specific Gravity. Approximate total length, eleven inches.

Range No.	1	2	3	4	5	6
Scale, Twaddle	0–24	24–48	48–72	72–102	102–134	134–180
Subdivisions	½	½	½	½	½	½
Each	**$1.25**	**1.25**	**1.25**	**1.25**	**1.25**	**1.25**

Dozen lots, 10% discount.

11-590. HYDROMETER, Alcohol; with Tralle (per cent) and Proof Scales, reading from 100° below to 100° above Proof, in 2° subdivisions; Tralle (per cent) scale 0 to 100°, in 1° subdivisions. This hydrometer has a printed scale. Approximate total length, 12 inches.
Each, $1.25
Dozen lots, 10% discount.

11-595. THERMO-HYDROMETER, Alcohol, U. S. Custom House Standard; with Tralle (per cent) and Proof Scales, reading from 100° below to 100° above Proof, in 2° subdivisions; Tralle scale from 0 to 100°, in 1° subdivisions; with a thermometer and temperature correction scale enclosed in the hydrometer. Approximate total length, 15 inches.
Each, $4.50



2-500

2-500. HYDROMETER, Battery; for determining the strength of battery fluids in storage and other cells. This tester does away with the splashing of acid in transferring the liquid to a hydrometer jar. Sufficient battery liquid to float the hydrometer is drawn into the glass tube, and the reading made directly. The scale of the hydrometer is marked in Specific Gravity, and also with the words indicating the strength of the fluid. The battery is fully charged at 1.280, and is empty or "dead" at 1.150. The tester is prevented from rolling by a square rubber piece placed over the end of the glass tube.
Each, complete, **$1.00**

11-600. HYDROMETER, Battery; with Specific Gravity scale 1.100 to 1.400. Approximate total length, 5 inches.
Each, $ .75

11-603. HYDROMETERS, Petroleum, A.P.I. Based on the modulus of 141.5; recommended by the American Petroleum Institute and accepted by the U. S. Bureau of Standards and U. S. Bureau of Mines. The relation of Degrees A.P.I. to Degrees Specific Gravity, is expressed by the formula:

$$\text{Degrees A.P.I.} = \frac{141.5-131.5}{\text{Sp. Gr.}}$$

(*Sp. Gr. is the specific gravity of the oil at 60° F., referred to water at 60° F.*)

These hydrometers are glass, weighted with mercury, and are about 12 inches long. Hydrometer **A** is graduated in 1° subdivisions, while all the other hydrometers, **B** to **K** inclusive, are graduated in 0.1° subdivisions.

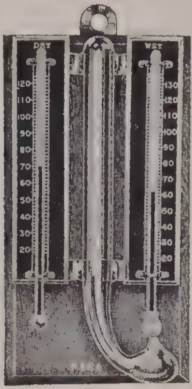
Range	A	B	C	D	E
Scale, Minimum, Degrees	10	10	19	29	39
Scale, Maximum, Degrees	100	21	31	41	51
Each	**$2.50**	**2.75**	**2.75**	**2.75**	**2.75**

Range	F	G	H	J	K
Scale, Minimum, Degrees	49	59	69	79	89
Scale, Maximum, Degrees	61	71	81	91	100
Each	**$2.75**	**2.75**	**2.75**	**2.75**	**2.75**

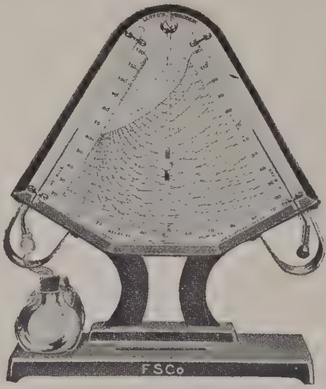
11-605. HYDROMETER (Salinometer); for reading percentage of salt content. Scale 0 to 100% in 1% subdivisions. Approximate total length, 12 inches.
Each, $1.25

11-610. HYDROMETER, Sugar, Brix Scale. Standardized at 17½° C. Approximate length, 12 inches.

Range	A	B	C
Scale (Brix)	0–30	30–60	60–90
Subdivisions	½	½	½
Each	**$1.75**	**1.75**	**1.75**



11-615



11-640

11-615. HYGROMETER, Mason; with a pair of thermometers one (1) wet-bulb and the other dry-bulb. Used for determining the amount of moisture in the air, relative humidity and the dew point.

Two (2) magnifying mercury-filled thermometers with black-oxidized scales with white figures; range 20° to 120° F. With glass syphon water bottle; all mounted on an oak board 8½ inches by 4½ inches, with provision for hanging. **Each, $5.00**

11-620. CISTERN, for No. 11-615 Hygrometer.. **Each, $ .75**

11-625. THERMOMETER, Dry-Bulb, with scale; for No. 11-615 Hygrometer.................... **Each, $2.00**

11-630. THERMOMETER, Wet-Bulb, with scale; for No. 11-615 Hygrometer.................... **Each, $2.00**

11-635. WICKS, for No. 11-615 Hygrometer.. **Each, $ .20**
Per dozen, $1.80

11-640. HYGRODEIK, Mason. A Wet-and-Dry-Bulb Hygrometer with thermometer tubes mounted on a chart, on the margins of which are temperature readings which correspond closely to the engraved scales on the thermometers.

When the swing index is at the intersection of the lines from the readings of the two (2) thermometers, it points to the relative humidity on the scale at the bottom of the chart. This eliminates the necessity of making calculations.

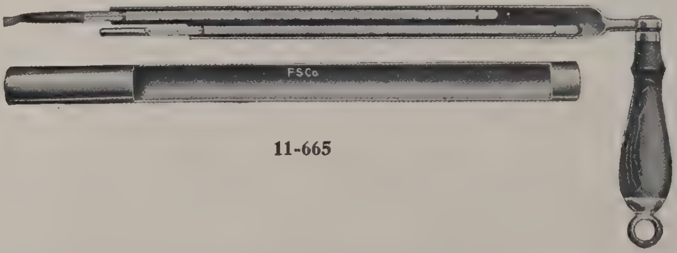
The dial has nickel-silver finish; gray-enameled brass frame; with two (2) magnifying-front mercury-filled thermometers, range 20° to 120° F. **Each, $18.50**

11-645. CISTERN, for No. 11-640 Hygrodeik.. **Each, $ .75**

11-650. THERMOMETER, Dry-Bulb, engraved stem; for No. 11-640 Hygrodeik. The thermometer used on the right side. **Each, $3.75**

11-655. THERMOMETER, Wet-Bulb, engraved stem; for No. 11-640 Hygrodeik. The thermometer used on the left side. **Each, $3.75**

11-660. WICKS, for No. 11-640 Hygrodeik... **Each, $ .20**
Per dozen, $1.80



11-665

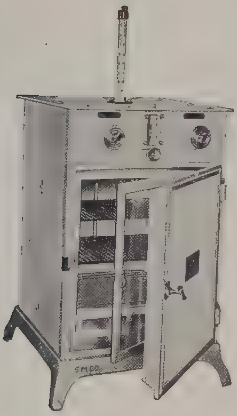
11-665. HYGROMETER, Sling Psychrometer. A Wet-and-Dry-Bulb Hygrometer which can be whirled, whereby thermometer reading can be obtained more accurately and in a shorter time. This is whirled for fifteen (15) or twenty (20) seconds and read, then repeated until two (2) or more readings agree.

A copper case is provided to protect the thermometer when not in use; the thermometers have a range from 0° to 100° F., and are easily read to one-half (½) degree. **Each, $13.75**

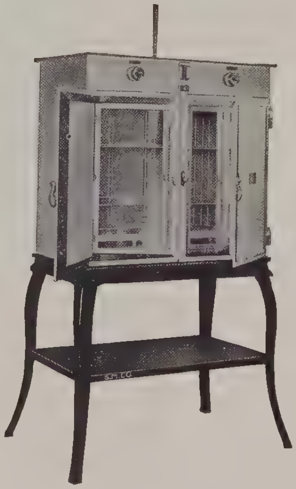
11-670. THERMOMETER, for No. 11-665 Hygrometer. The same thermometer can be used as the wet-bulb or the dry-bulb. **Each, $4.00**

11-675. WICKS, for No. 11-665 Hygrometer.. **Each, $ .20**
Per dozen, $1.80

INCUBATORS



11-680
Size A



11-685
Size D

FREAS INCUBATORS

11-680. INCUBATOR, Freas, Electric. This incubator has a double transite wall, the space between being filled with air cell asbestos insulation so as to reduce heat radiation to a minimum. The door is double-walled cast aluminum, and has a window to permit observation of the contents of the incubator without having to open the door. Heat is furnished by a Nichrome wire, mounted at the bottom of the incubator. Temperature regulation is accomplished by the Freas Thermo Regulator, which makes and breaks the contact in the electrical circuit and maintains the temperature to within 0.5° C. A lower contact point serves as an approximate indicator, which can be adjusted to the desired temperature as indicated on a scale in the front of the incubator. Final temperature adjustment is effected by adjusting this contact until the desired temperature is obtained, as indicated by the thermometer inserted through the top of the incubator.

The pilot lamp is lit whenever the current is turned on, and serves as an indicator of the condition of the heating apparatus. All switches and controls are operated from the exterior of the incubator. An inner glass door permits observation of the contents of the incubator without exposure to the outside air with consequent temperature change. Size A incubator has a cast-iron base for use on a table, while the larger sizes B and C have individual floor-stands (as illustrated with No. 11-685) which bring the incubator to a convenient height.

Freas Incubators supplied under this number are for use on **110 volt current** and have thermometer, cord and plug for connecting.

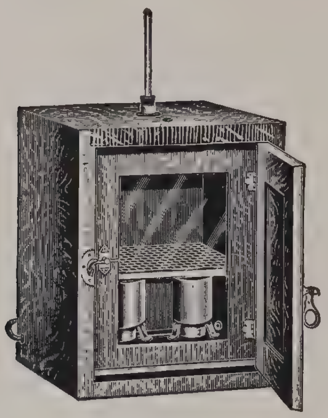
Size	A	B	C
Width, inside, inches	12	16	18
Height, inside, inches	12	16	18
Depth, inside, inches	12	14	16
Each, for 110 volts	**$140.00**	**250.00**	**270.00**

Incubators for use on 220 volt current are supplied to order, at the same prices.

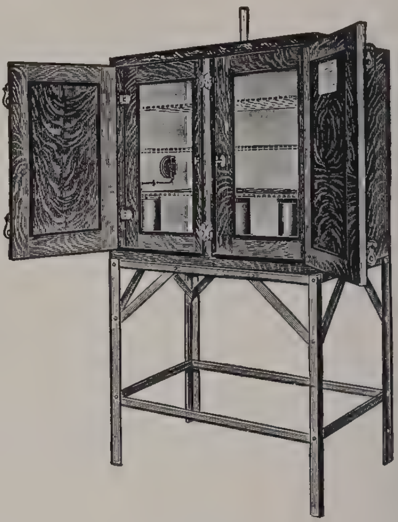
11-685. INCUBATORS, Freas, Double Door, Electric. These incubators are similar to No. 11-680 in construction and operation, excepting that they have a double set of doors; two outer doors and two inner glass doors. They are equipped with substantial metal floor-stands which bring the incubator to a convenient working height. They are for use on **110 volt current.** Supplied with thermometer.

Size	D	E
Width, inside, inches	26	32
Height, inside, inches	20	22
Depth, inside, inches	14	18
Each	**$340.00**	**410.00**

Incubators for use on 220 volt current are supplied to order, at the same prices.



11-690
Size No. 11



11-700
See also No. 11-695

C. S. & E.
INCUBATORS

11-690. INCUBATORS, C. S. & E., Electric. The walls of these incubators are made of seasoned, quarter-sawed oak, lined with transite, insulated animal hair, and two (2) layers of impregnated paper. This construction prevents warping and cracking, and is impervious to moisture. The incubators have a temperature range from 30° to 60° C., and when shipped are set to operate at 37.5° C. The necessary heat is derived from electric light bulbs controlled by a thermostat. The thermostat consists of a bronze disc to which is attached a hard rubber disc which expands and contracts with the temperature, and moves a contact point which makes-and-breaks the circuit through the lamps. A condenser in the base of the thermostat prevents arcing at the contact. Ventilation is effected by air entering the incubator through holes in the bottom, and leaving through holes at the top.

These incubators are the smaller sizes and are designed for use on a table. Sizes No. 1 and No. 3 have single glass doors. Size No. 11 has an inner door of glass and an outer door of wood. C. S. & E. Incubators supplied under this number are for operation on **110 volt current**, and are equipped with thermometer and lamps for heating.

If desired, these incubators can be supplied with Nichrome heating coils instead of the lamps.

Size No.	1	3	11
Width, inside, inches	7	9	12
Height, inside, inches	9	12	15
Depth, inside, inches	7	9	10½
Each, for 110 volts	**$35.00**	**40.00**	**65.00**

Incubators for use on 220 volt current are supplied to order, at the same prices.

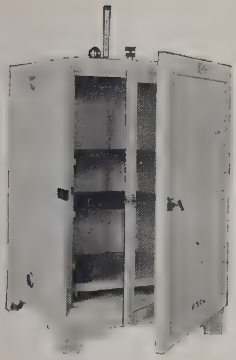
11-695. INCUBATORS, C. S. & E., Electric, with stands. These incubators are similar to No. 11-690 in construction and operation, excepting that they have an inner door of glass and an outer door of wood. They are equipped with metal floor-stands which bring the incubators to a convenient working height. The incubators supplied under this number are for use on **110 volt current.** With thermometer.

Size No.	32	41
Width, inside, inches	18	20
Height, inside, inches	26	30
Depth, inside, inches	18	18
Each	**$112.50**	**137.50**

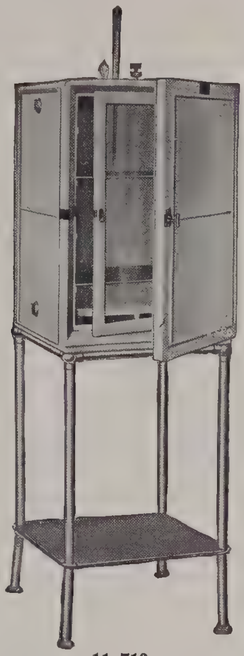
Incubators for use on 220 volt current are supplied to order, at the same prices.

11-700. INCUBATOR, C. S. & E., Double Door, Electric. This incubator is similar to No. 11-690 in construction and operation excepting that it has a double set of doors; two (2) inner doors of glass and two (2) outer doors of wood. It is equipped with a metal floor-stand which brings the incubator to a convenient working height. Supplied under this number for use on **110 volt current.**

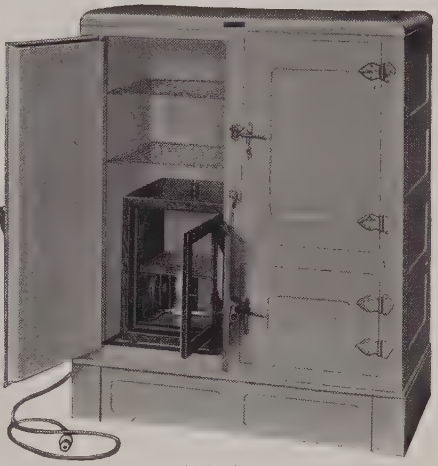
Inside width, 36 inches; inside height, 30 inches; inside depth, 18 inches. Supplied with a thermometer. **Each, $240.00**



11-705
Size No. 4



11-710
Size No. 5



11-715

11-705. INCUBATOR, Thelco, Electric. This incubator has a double transite wall, the space between being filled with air cell insulation. The outside is finished in white laboratory enamel, which can be cleaned with a moist cloth. The heat is furnished by a replaceable coil of Nichrome wire. Temperature regulation is accomplished by means of the Thelco Bimetallic Thermostat, which makes-and-breaks a contact in the electrical circuit and maintains the temperature to within 0.5° C. of the desired temperature, as indicated by the thermometer inserted into the top of the incubator.

A pilot lamp on the top lights whenever the current is on, and serves as an indicator of the condition of the heating apparatus. All controls are operated from the outside of the incubator. An inner glass door permits of observation of the contents without exposure to the outside air with consequent temperature variation. Incubators are mounted on a cast-iron base for table use.

Thelco Incubators are supplied with thermometer, and cord and plug, for use on **110 volt current.**

Size No	2	4
Width, inside, inches	12	18
Height, inside, inches	12	26
Depth, inside, inches	12	18
Each	**$75.00**	**110.00**

Incubators for use on 220 volt current are supplied to order, at the same prices.

11-710. INCUBATORS, Thelco, Electric, with stands. These incubators are similar to No. 11-705 in construction and operation, excepting that they have metal floor-stands which bring the incubator to a convenient working height. Size No. 5 has single inner and outer doors. Size No. 7 has double inner and outer doors.

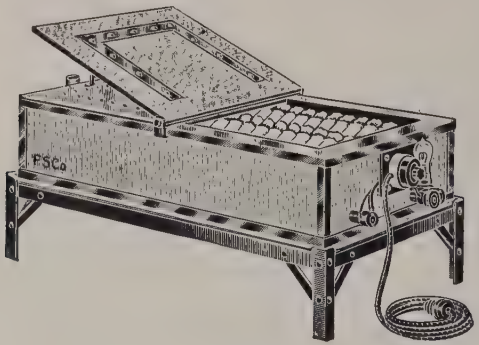
Supplied with thermometer, and cord and plug; for use on **110 volt current.**

Size No	5	7
Width, inside, inches	18	38
Height, inside, inches	26	28
Depth, inside, inches	18	18
Each	**$130.00**	**185.00**

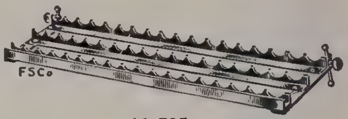
Incubators for use on 220 volt current are supplied to order, at the same prices.

11-715. INCUBATOR, Low Temperature, Combined Refrigerator and Incubator; for low temperature incubation (10° C. to 30° C.) of gelatine cultures. This incubator consists of a large refrigerator, one compartment of which is equipped with constant-low-temperature incubator. The incubator is 15 x 12 x 10½ inches inside, and is similar in construction to the No. 11-690 Incubator. The refrigerator proper is built of galvanized iron, riveted and seamed so as to be water-tight, finished in white enamel. Insulation is effected by two (2) thicknesses of matted flax waterproofed fiber. Between the two (2) fiber walls is a dead air space ¾ inch thick. Enamel lining is used throughout the interior. The refrigerator is 39 x 21 x 49 inches high on the outside. The temporary storage compartments are 17 x 17 x 36 inches and 17 x 17 x 11 inches, while the ice compartment is 14 x 17 x 22 inches with a capacity of about 150 pounds of ice. This provides ample cold storage room for the laboratory, in addition to the incubation space. Apparatus as described, complete with thermometer, cord and plug for connecting the incubator to the laboratory lighting circuit, **for 110 volt current.** **Each, $160.00**

Incubators



11-720

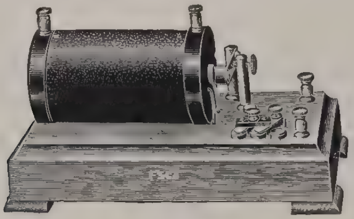


11-725

11-720. INSPISSATOR, C. S. & E.; for the coagulation of blood serums. This inspissator coagulates the blood by heating it at a fixed temperature for a definite period of time. The blood is placed in test tubes supported on No. 11-725 Racks, placed in the inspissator. A thermostat controls the temperature by making-and-breaking a contact in the electrical heating circuit. A snap switch is provided for rapidly bringing the inspissator to temperature. The apparatus is made of heavy copper, tinned on the inside and is 22 inches long by 12½ inches wide by 3½ inches deep. It has double walls which serve as a water-jacket. A pilot lamp indicates when the current is on or off. Inspissator is supplied with a 4 inch iron stand, centigrade thermometer, connecting cord and plug for use on **110 volt circuit**, but without racks. **Each, $100.00**

11-725. INSPISSATOR RACK, for use in No. 11-720 Inspissator. Made of polished brass and provided with adjustable legs for tilting the rack to different angles. Each rack accommodates eighteen (18) test tubes, while the inspissator accommodates two (2) racks. **Each, $10.00**

IGNITION APPARATUS, for operating spark gaps in various apparatus, see No. 10-840.



11-730

11-735

11-730. INDUCTION COIL, Ruhmkorff; for operating spark gaps, eudiometers, ignition apparatus, spectrum tubes, etc. This coil has a core composed of a bundle of soft iron wires, around which are wound the primary and secondary coils of copper magnet wire. This induction coil is equipped with an automatic interrupter which is excited by the core and opens and closes the circuit. An adjustable stop for the interrupter permits the speed of the interrupter to be varied as desired. The coil is mounted on a polished mahogany base with binding post for both circuits.

Size of spark, inches	¼	½	1
Each	**$8.00**	**12.00**	**20.00**

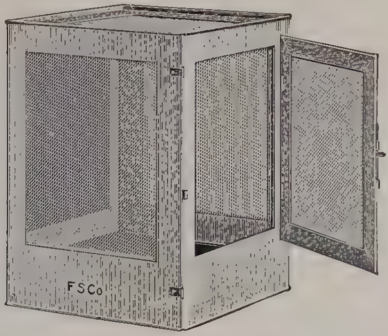
11-735. INK, Higgins, Black, waterproof. In ¾ ounce bottles with quill attached to stopper......**Each, $ .35**

A REQUEST

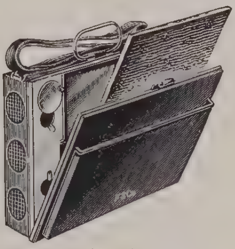
We will appreciate any information as to new methods, special apparatus required for research or any difficulties encountered in the use of laboratory materials.

In this way, you will greatly assist us in our endeavor to keep the development of apparatus abreast with the latest requirements.

FISHER SCIENTIFIC CO.



11-740

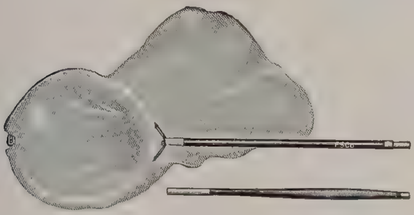


11-750

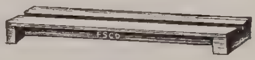
11-740. INSECT BREEDING CASE, Folding. Made entirely of non-corrosive metal; top and sides are wire gauze; easily adjusted, folds flat for storage or transportation. Size, 12 x 12 x 16 inches high. **Each, $10.00**

11-745. TRAY, for No. 11-740, for use with aquatic insects. . . . . **Each, $2.20**

11-750. INSECT COLLECTING CASE, with compartments for nets, larvae, killing bottles, etc., and cork plate for butterflies. Made entirely of metal, enameled; equipped with clasp and carrying handle. Size 8 x 11½ x 2¼ inches deep. **Each, $9.75**



11-755

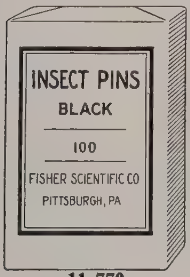


11-760

11-755. INSECT NET, with folding non-corrosive netting, especially adapted for butterflies. Equipped with four-foot, jointed handle, and a detachable metal frame for the net. The frame folds flat, so that the complete net with handle can be carried in the 2-foot muslin case supplied with it. **Each, $6.00**

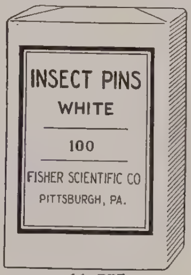
11-760. INSECT SPREADING BOARD, cork lined, with slanting linden wood tops; constructed to prevent warping. Length, 16 inches; width, 3¾ inches. **Each, $1.80**

INSECT BOTTLES, see No. 3-075, page 87. **INSECT MOUNTS,** see No. 2-790 and No. 2-795, page 77.



11-770

Insect Pins



11-775

11-770. INSECT PINS, Black, with rounded yellow heads; very thin and stiff, with sharp points. These pins are all about 1½ inches long, but vary in thickness. Sold only in packages of 100 pins, or packages of 500 pins.

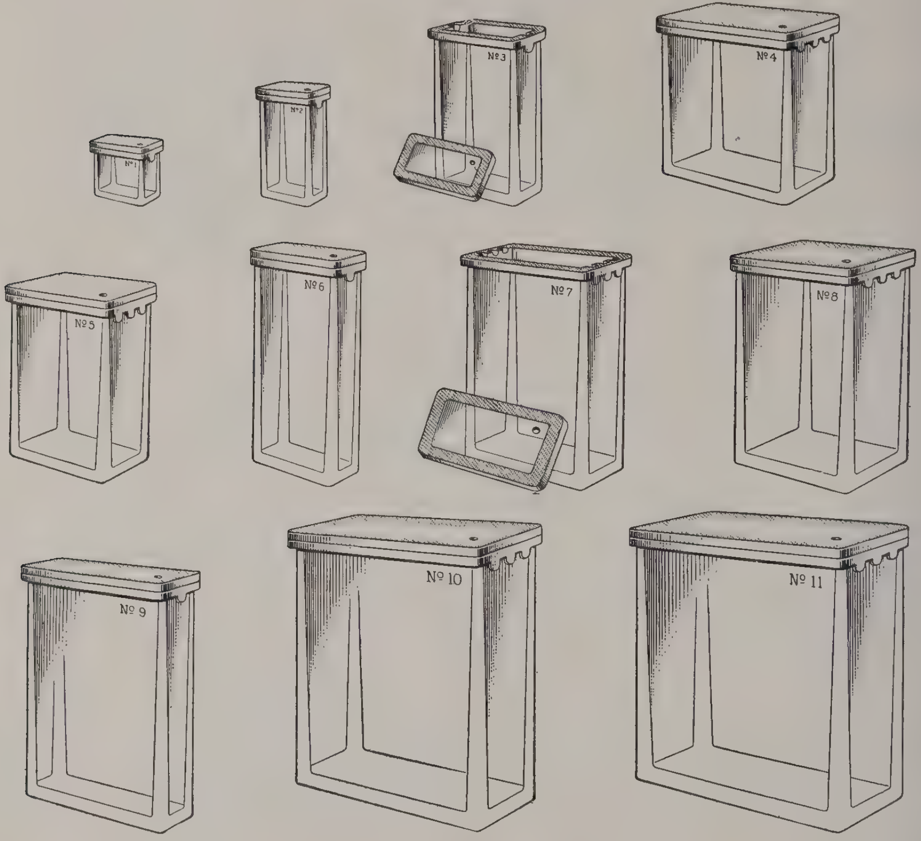
Size No.	0	1	2	3	4	5
Gauge No.	28	26	25	24	23	21
Small pkg. (100 pins)	$ .55	.55	.55	.55	.55	.55
Large pkg. (500 pins)	$2.25	2.25	2.25	2,25	2.25	2.25

11-775. INSECT PINS, White, with rounded heads; very thin and stiff, with sharp points. These pins are all about 1½ inches long, but vary in thickness. Sold only in packages of 100 pins, or packages of 500 pins.

Size No.	0	1	2	3	4	5
Gauge No.	28	26	25	24	23	21
Small pkg. (100 pins)	$ .55	.55	.55	.55	.55	.55
Large pkg. (500 pins)	$2.25	2.25	2.25	2.25	2.25	2.25

INSECT PINNING FORCEPS, see No. 10-270.

MUSEUM JARS



11-780

11-780. MUSEUM JARS, Rectangular, American Medical (*Patented June, 1919*). A new style of rectangular jars with recesses in the top of jars to hold glass rods or frames for supporting the specimens. The jars are pressed in iron molds and are superior to the German jars blown in wooden molds, in that the inside and outside surfaces of the sides are parallel, and thus the view of the specimen is not distorted; the edges and corners of the jars are thick and strong, rather than thin as in the case of the German jar. These American jars are made of clear, decolorized glass.

These jars are double-annealed and are tested for strains; the surfaces are fire-polished planes. The reinforced tops are ground true, thus providing a wide surface for sealing; the bottom surfaces are ground flat so that the jars stand firmly.

The covers are of the same clear glass as the jars, are also pressed and polished and have the same finished appearance as the jars. They have wide ground surfaces corresponding with the ground tops of the jars. Each cover has a small opening in the corner, through which the fluid content of the jar can be changed or additional fluid added after sealing.

The method of suspending the specimen from the top, overcomes the difficulties attended with mounting the specimens on a frame resting on the bottom of the jar, and also eliminates the tilting back and forth.

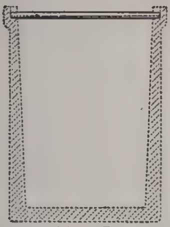
The narrow jars have one recess; the deep jars have three recesses so that the support can be suspended in the front, in the middle, or in the rear.

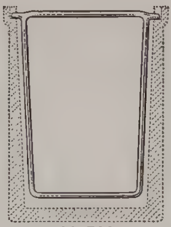
These jars are made in eleven different sizes, as recommended by the International Association of Medical Museums.

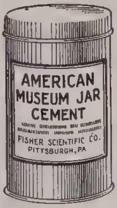
Cement No. 11-795 is recommended for sealing these jars. Prices are for jars and covers without support rods or frames, which are listed separately under No. 11-785 and No. 11-790.

Size No.	1	2	3	4	5	6	7	8	9	10	11
Height, inside, cm	5	10	15	15	16	20	20	20	22	25	25
Width, inside, cm	5	4½	8	15	10	8	13	13	15	22	25
Depth, inside, cm	3	3	5	9	8	4½	8	13	5½	5½	12
Number to a carton	60	60	24	12	12	15	6	6	6	3	2
Each	**$ .60**	**.75**	**1.30**	**2.50**	**2.10**	**2.50**	**2.70**	**3.25**	**3.15**	**8.40**	**12.75**

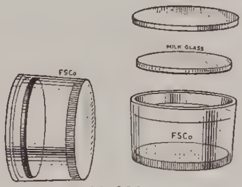
Carton lots, 10% discount.


11-785


11-790



11-795



11-800

11-785. SUPPORT RODS, for No. 11-780 Museum Jars. The rods fit in the recesses in the jars and are used to support large firm specimens which do not require a frame.

For Jar, size No.	1	2	3	4	5	6	7	8	9	10	11
Each	**$ .10**	**.10**	**.10**	**.12**	**.10**	**.10**	**.12**	**.12**	**.12**	**.15**	**.15**

Dozen lots, 10% discount.

11-790. SUPPORT FRAMES, for No. 11-780 Museum Jars. The projections at the top of the frame fit in the recesses in the jars. Used for specimens that require stretching on a frame and for those that require support at the sides as well as at the top.

For Jar, size No.	1	2	3	4	5	6	7	8	9	10	11
Each	**$ .30**	**.30**	**.30**	**.35**	**.33**	**.40**	**.40**	**.40**	**.50**	**.50**	**.60**

Dozen lots, 10% discount.

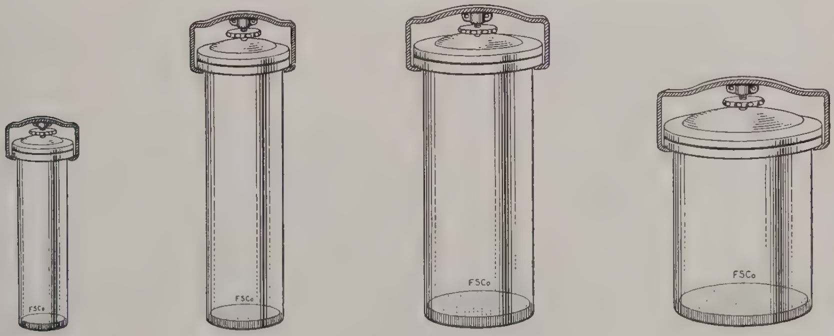
11-795. CEMENT, Museum Jar; for sealing No. 11-780 Museum Jars. All ready prepared to heat and apply with a brush. Supplied in one (1) pound cans, which is sufficient for sealing fifty (50) medium sized jars. Complete directions for sealing the jars are printed on the labels. **Per 1 lb. can, $1.25**

11-800. JAR, Museum, Eye Specimens. Designed especially by Dr. Henry Albert, to meet the requirements of mounting, preserving, displaying, and labeling eye specimens.

The specimen is viewed through the bottom of the jar, which is clear colorless glass, ground true and polished. A pure white milk-glass disc fits inside the jar on a ledge 5 mm. below the top; this makes an ideal background for the specimen.

A heavy clear-glass disc cover with ground and polished edges, fits over the top of the jar. The space between the milk-glass disc and the cover is filled with sealing material and the identification label is placed underneath the cover, where it remains permanent and unsoiled, and is viewed through the cover.

Height, including cover, 35 mm.; diameter of polished bottom, 50 mm. **Each,** complete, **$ .75**
Dozen lots, 10% discount

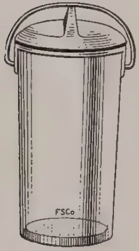


11-805

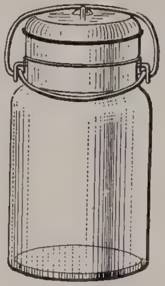
11-805. JARS, Museum, Cylindrical; with metal clamp, rubber gasket, and glass cover which has rings on the lower side for suspending specimens.

Diameter, inches	2¼	3½	3½	5	5	6¼	7⅝
Height, inches	8	8	12	8	12	8	12
Capacity, pints	1	2½	4	5½	8	8	18
Each	**$2.10**	**2.50**	**3.60**	**5.35**	**6.35**	**6.85**	**12.00**

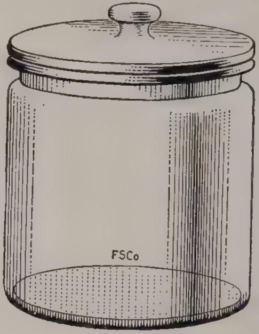
Dozen lots of a size, 10% discount.



11-810



11-815



11-825

JARS, Aquarium, see Aquaria No. 1-385, page 18.
JARS, Anerobic Culture, see No. 1-220, page 11.
JARS, Battery, see Battery Jars, page 65.
JARS, Bell, see Bell Jars, page 70.
JARS, Staining, see Dishes, Staining, No. 8-810 to No. 8-830, page 296.

11-810. JARS, Preservation; made of clear glass. The glass covers have rims which fit inside the jars and prevent their sliding off; provided with rubber gaskets. The covers are held tightly by a wire clamp.

Capacity, ounces	1½	5	8	14
Each	$ .22	.25	.30	.40

Dozen lots of a size, 10% discount.

11-815. JARS, Preservation; made of **clear glass** with glass covers which fit over the rims of the jars; provided with rubber gaskets; covers are held tightly by the wire clamps permanently attached to the jars. Inexpensive and very useful in the laboratory for temporary storing of specimens, collecting or storing samples, or for containers for materials.

Capacity, ounces	8	16	32	64
Number to a case	144	108	56	42
Each	$ .15	.20	.25	.35

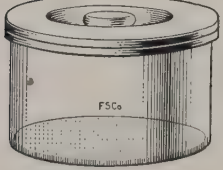
Dozen lots, 10% discount. **Case lots,** 20% discount.

11-820. RUBBER GASKETS, for No. 11-815 Jars. The same size gasket fits any one of the four (4) sizes of jars.
Per dozen, $ .15
Per gross, $1.50

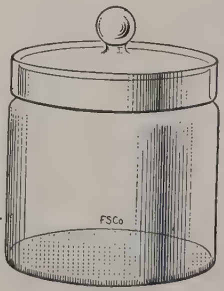
11-825. JARS, Storage; made of clear glass with glass covers which have rims to prevent the covers sliding off. The covers have glass knobs and are ground sufficiently to fit truly, but not to be air-tight.

Capacity, quarts	1	2	4	8
Diameter, with cover, inches	4⅞	5¾	7	9
Height, without cover, inches	5⅛	6¼	7⅝	10
Each	$ .45	.75	1.40	2.40

Dozen lots of a size, 10% discount.



11-830



11-835

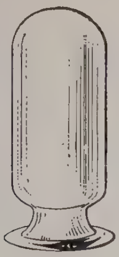
11-830. JARS, Storage; made of clear glass with glass covers which have rims to prevent the covers sliding off. The covers have glass knobs which are countersunk. Covers fit truly, but are not ground. This is a low wide-shaped jar designed so that the jars can be placed one on top of the other.

Capacity, pints	2	3	6	9	16
Diameter, top, inches	6⅜	6⅜	8½	9¾	11½
Height, without cover, inches	3⅜	4½	5	5¾	7
Each	$ .55	.65	1.25	1.70	3.40

Dozen lots of a size, 10% discount.

11-835. JARS, made of clear glass with glass covers, which fit well over the shoulders on the jars. The covers have glass knobs. These jars are sometimes called "Dressing Jars."

Diameter, inches	4	6
Height, inches	4	6
Each	$1.10	2.25



3-310

3-315

3-325

3-310. JARS, Display, Inverted Form; of clear flint glass, for cork stoppers; for storing and showing samples of chemicals, cereals, minerals, materials in different stages of manufacture, etc.

Capacity, ounces	2	4	8	16	32
Height, inches	2¾	4½	6	7¾	9
Diameter, inches	1½	2	2½	2¾	3½
Each	$ .28	.32	.40	.55	.70

Dozen lots of a size, 15% discount.

3-315. JARS, Sample, Screw Cap, Round; made of clear glass with satin finished aluminum screw caps having waxed pasteboard liners which prevent the contents from coming in contact with the metal, and also act as washers for tight sealing. Used for samples, for specimens, or as laboratory containers; are very convenient for transporting.

Capacity, ounces	1	2	4	8	16	32
Per dozen	$ .65	.75	1.10	1.40	2.40	3.00

Gross lots of a size, 15% discount.

3-320. JAR CAP LINERS of Cork; to fit No. 3-315 Jars.

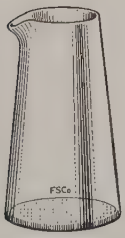
For Jar, ounces	1	2	4	8	16	32
Per dozen	$ .15	.18	.20	.28	.30	.40

Gross lots of a size, 15% discount.

3-325. JAR. Sample, Screw Cap, Square; with satin finished aluminum screw caps with **cork** liners. Used for ples, for specimens, or as laboratory containers; are very convenient for transporting.

Capacity, ounces	1	2	4	8
Per dozen	$1.25	1.40	1.80	2.30

Gross lots of a size, 15% discount.



11-840

11-845

11-840. JARS, Precipitating; made of heavy glass with lip for pouring, and tapering sides; the contents can be poured from this shape with better control.

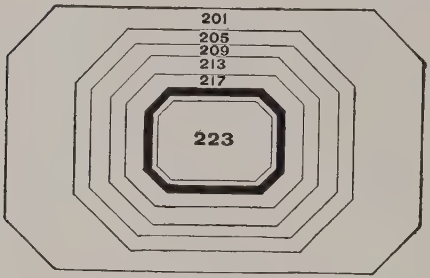
Capacity, pints	½	1	2	4	8	12
Each	$ .85	1.25	1.75	2.25	3.00	5.00

11-845. JARS, Stoneware, glazed; with loosely fitting covers, without handles. Used for storing chemicals or for waste jars in the laboratory. Prices given include packing for shipment.

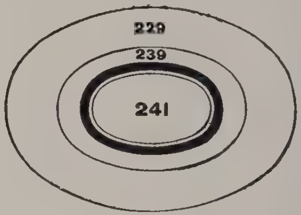
Capacity, gallons	1	2	4	6
Each	$ .85	1.50	2.30	3.40

KJELDAHL APPARATUS, see Nitrogen Determination Apparatus, pages 473-476.
KJELDAHL FLASKS, see Flasks No. 11-110, page 346.
KNIFE, for Corks, see Cork Knife No. 7-875, page 262.

LABELS



11-850
See also No. 11-855 and No. 11-860



11-865

11-850. LABELS, Rectangular, Gummed; made of white paper with red borders.

Size No.	201	205	209	213	217	223
Length, mm.	64	43	37	30	27	21
Width, mm.	40	34	28	24	20	17
Number in a box	50	75	100	100	125	150
Per box	**$ .10**	**.10**	**.10**	**.10**	**.10**	**.10**
Per carton (1 doz. boxes)	**$1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

11-855. LABELS, Narrow, Rectangular, Gummed; made of white paper with red borders.

Size No	219	259	261
Length, mm.	38	33	51
Width, mm.	19	14	14
Number in a box	125	150	125
Per box	**$ .10**	**.10**	**.10**
Per carton (1 doz. boxes)	**$1.00**	**1.00**	**1.00**

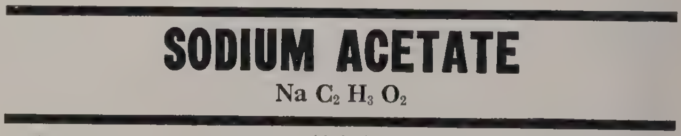
11-860. LABELS, Large, Rectangular, Gummed; made of white paper with red borders.

Size No.	2004	2007	2001
Length, mm.	70	70	95
Width, mm.	25	40	40
Number in a box	75	75	75
Per box	**$ .20**	**.20**	**.25**
Per carton (10 boxes)	**$1.75**	**1.75**	**2.25**

11-865. LABELS, Oval, Gummed; made of white paper with red borders.

Size No.	229	239	241
Length, mm.	42	27	21
Width, mm.	30	17	14
Number in a box	75	150	175
Per box	**$ .10**	**.10**	**.10**
Per carton (1 doz. boxes)	**$1.00**	**1.00**	**1.00**

11-870



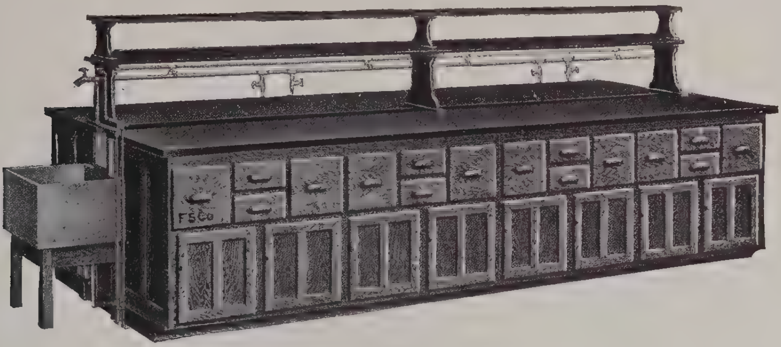
11-875

11-870. LABELS, Microscope Slide, Gummed. The standard label for microscope slides; of white paper with blue borders, 22 mm. square. In boxes containing 100 labels.
Per box, $ .15
Per carton (1 doz. boxes), **$1.50**

11-875. CHEMICAL LABEL BOOK, with Names and Formulae. The book contains 365 labels, in book form of 32 pages. Each label is gummed and is perforated so that it is easily taken from the book. Waxed paper leaves, permanently bound in the book, prevent the labels from sticking. There are two (2) or more labels for the chemicals most used. The labels are white, the names are black, bold-face caps, and the formulae are printed in smaller type. On the inside front cover of the book is a Table of International Atomic Weights.
Each, $ .85

DOUBLE CHEMISTRY TABLES

WITH GUTTER AND END-SINK



11-880

See also No. 11-885, No. 11-890 and No. 11-895

11-880. CHEMISTRY TABLE, Double; for Educational or Industrial Laboratories. A very practical and convenient table, the construction of which is the result of considerable experience. It is shipped in sections; the plumbing is all exposed and completed to the floor line. This table will accommodate sixteen (16) students, working in two (2) sections of eight (8) each, and provides one (1) cupboard, one (1) large drawer, and one (1) small drawer for each of the sixteen (16) students.

SPECIFICATIONS

Size. 12 feet long by 4 feet wide by 3 feet high.

Top. 1⅝ inches thick birch, matched, glued, dressed, and cleated to prevent warping.

Material and Construction. Table is made of selected oak, constructed with mortise and tenon joints, to stand hard service. Doors and drawers are made with lap fronts in order to exclude dust. Drawers are of tenon and groove construction, with maple sides, full framed-in bottoms, and extension at back to safeguard against dropping when pulled out. Reagent shelves are made with retaining rims. Table is provided with toe space.

Drawers and Cupboards. Each student is provided with two (2) drawers and one (1) cupboard. Large drawers measure inside, 8¼ inches by 9¾ inches by 15 inches, small drawers measure inside, 3¼ inches by 9¾ inches by 15 inches, and the cupboards measure inside, 18¾ inches by 16¼ inches by 17 inches. Each cupboard is equipped with one (1) shelf.

Locks. Drawers and doors are equipped with high grade master-keyed locks in sets of three (3). The three (3) locks are alike, but each set is different. Master key to pass all locks is furnished. Each set of locks is marked with a brass number plate.

Gutter and Sink. Gutter is lead lined or soapstone, draining into sink at end of table, 5½ inches wide by 2 inches deep in the upper end, slanting down to 5 inches at the sink. Sink is soapstone, 10½ inches deep by 14 inches by 18 inches, equipped with special acid resisting lead waste plug and trap, and nickel-plated overflow with beehive strainer.

Plumbing. Plumbing consists of four (4) nickel-plated compression water cocks with detachable hose nipples (by removing the hose nipple, a Richard's filter pump can be attached). One (1) nickel-plated compression water cock threaded for regular ¾ inch hose connection, and eight (8) nickel plated, needle point, gas cocks with galvanized iron piping to floor line. Exposed piping is aluminum bronzed. Each line is furnished with a shut-off valve near the floor.

Finish. Birch tops and reagent shelves are treated acid proof. Other exposed parts are finished standard light oak with one (1) coat of filler and three (3) coats of varnish, rubbed. Inside of drawers and cupboards is varnished.

Weight. Crated, with wood top, 2,000 pounds. Table is shipped in sections.

No. 11-880 Table, with **wood top** and **master-keyed locks**........................ **Each, $484.00**

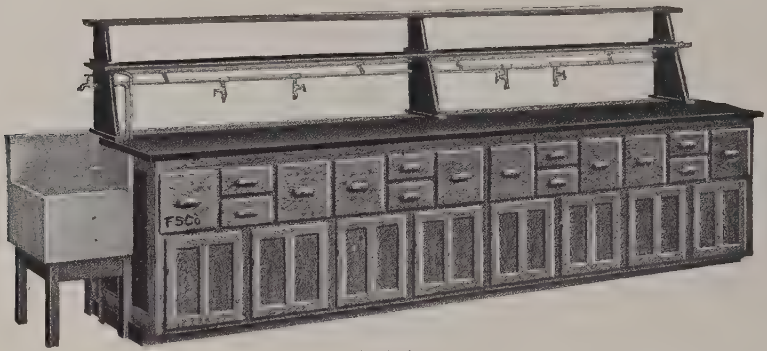
11-885. CHEMISTRY TABLE, Double; similar to No. 11-880, with **wood top,** but **without locks. Each, $436.00**

11-890. CHEMISTRY TABLE, Double; similar to No. 11-880, but with 1¼ inch **soapstone top** which is quite desirable; **with master-keyed locks.** Weight, 2,700 pounds. **Each, $508.00**

11-895. CHEMISTRY TABLE, Double; similar to No. 11-880, but with 1¼ inch **soapstone top** which is quite desirable; **without locks. Each, $460.00**

SINGLE CHEMISTRY TABLES

WITH GUTTER AND END-SINK



11-900

See also No. 11-905, No. 11-910 and No. 11-915

11-900. CHEMISTRY TABLE, Single, Wall Form. This table is the same style as No. 11-880, but is designed to be placed along the wall. It accommodates eight (8) students, working in two (2) sections of four (4) each.

SPECIFICATIONS

Size. 12 feet long by 27½ inches wide by 3 feet high.

Top. 1⅝ inches thick birch, matched, glued, dressed, and cleated to prevent warping.

Material and Construction. Table is made of selected oak, constructed with mortise and tenon joints, to stand hard service. Doors and drawers are made with lap fronts in order to exclude dust. Drawers are of tenon and groove construction, with maple sides, full framed-in bottoms, and extension at back to safeguard against dropping when pulled out. Reagent shelves are made with retaining rims. Table is provided with toe space.

Drawers and Cupboards. Each student is provided with two (2) drawers and one (1) cupboard. Large drawers measure inside, 8¼ inches by 9¾ inches by 15 inches; small drawers measure inside, 3¼ inches by 9¾ inches by 15 inches and the cupboards measure inside, 18¾ inches by 16¼ inches by 17 inches. Each cupboard is equipped with one (1) shelf.

Locks. Drawers and doors are equipped with high grade master-keyed locks in sets of three (3). The three (3) locks are alike, but each set is different. Master key to pass all locks is furnished. Each set of locks is marked with a brass number plate.

Gutter and Sink. Gutter is lead lined or soapstone, draining into sink at end of table, 5½ inches wide by 2 inches deep in the upper end, slanting down to 5 inches at the sink. Sink is soapstone, 10½ inches deep by 14 inches by 18 inches, equipped with special acid resisting lead waste plug and trap, and nickel-plated overflow with beehive strainer.

Plumbing. Plumbing consists of four (4) nickel-plated compression water cocks with detachable hose nipples (by removing the hose nipple, a Richard's filter pump can be attached), one (1) nickel-plated compression water cock threaded for regular ¾ inch hose connections, and four (4) nickel-plated needle point gas cocks with galvanized iron piping to floor line. Exposed piping is aluminum bronzed. Each line is furnished with a shut-off valve near the floor.

Finish. Birch tops and reagent shelves are treated acid proof. Other exposed parts are finished standard light oak with one (1) coat of filler, and three (3) coats of varnish, rubbed. Inside of drawers and cupboards is varnished.

Weight. Crated, with wood top, 1,200 pounds. Tables are shipped in sections.
No. 11-900 Table, with **wood top** and **master-keyed locks**........... ....**Each, $290.00**

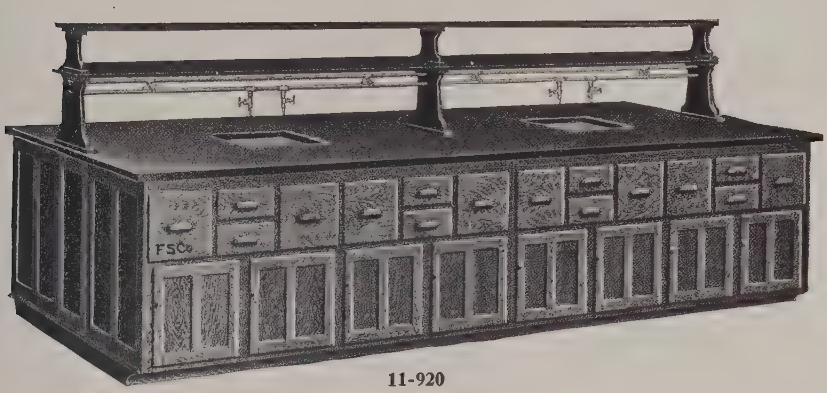
11-905. CHEMISTRY TABLE, Single; similar to No. 11-900, with **wood top,** but **without locks. Each, $266.00**

11-910. CHEMISTRY TABLE, Single; similar to No. 11-900, but with 1¼ inch **soapstone top; with master-keyed locks.** Weight, 1,900 pounds. **Each, $303.75**

11-915. CHEMISTRY TABLE, Single; similar to No. 11-900, but with 1¼ inch **soapstone top; without locks. Each, $279.75**

DOUBLE CHEMISTRY TABLES

WITH TWO CENTER-SINKS



11-920
See also No. 11-925,
No. 11-930 and No. 11-935

11-920. CHEMISTRY TABLE, Double; for Educational and Industrial Laboratories. In this table all piping of water, gas, and waste is inside the table. There are two (2) soapstone sinks in the center of the table; the plumbing is complete to the floor line. This chemistry table accommodates sixteen (16) students, working in sections of eight (8) each.

SPECIFICATIONS

Size. 12 feet long by 4 feet wide by 3 feet high.

Top. 1⅝ inches thick birch, matched, glued, dressed, and cleated to prevent warping.

Material and Construction. Table is made of selected oak, constructed with mortise and tenon joints, to stand hard service. Doors and drawers are made with lap fronts in order to exclude dust. Drawers are of tenon and groove construction, with maple sides, full framed-in bottoms, and extension at back to safeguard against dropping when pulled out. Reagent shelves are made with retaining rims. Table is provided with toe space. Back of cupboards is removable in order to give free access to the plumbing.

Drawers and Cupboards. Each student is provided with two (2) drawers and one (1) cupboard. Large drawers measure inside, 8¼ inches by 9¾ inches by 15 inches; small drawers measure inside 3¼ inches by 9¾ inches by 15 inches, and the cupboards measure inside 18¾ inches by 16¼ inches by 17 inches. Each cupboard is equipped with one (1) shelf.

Locks. Drawers and doors are equipped with high grade master-keyed locks in sets of three (3). The three (3) locks are alike, but each set is different. Master key to pass all locks is furnished. Each set of locks is marked with a brass number plate.

Sinks. Two (2) soapstone sinks 6 inches deep by 14 inches by 16 inches, equipped with a special acid resisting lead waste plug and trap, and nickel-plated overflow with beehive strainer.

Plumbing. Plumbing consists of four (4) nickel-plated compression water cocks and eight (8) nickel-plated needle point gas cocks with galvanized iron piping to floor line. Both the gas and the water lines are provided with shut-off valves near floor.

Finish. Birch tops and reagent shelves are treated acid proof. Other exposed parts are finished standard light oak with one (1) coat of filler, and three (3) coats of varnish, rubbed. Inside of drawers and cupboards is varnished.

Weight. Crated, with wood top, 1,900 pounds. Tables are shipped in sections.

No. 11-920 Table, with **wood top** and **master-keyed locks**.................... **Each, $455.00**

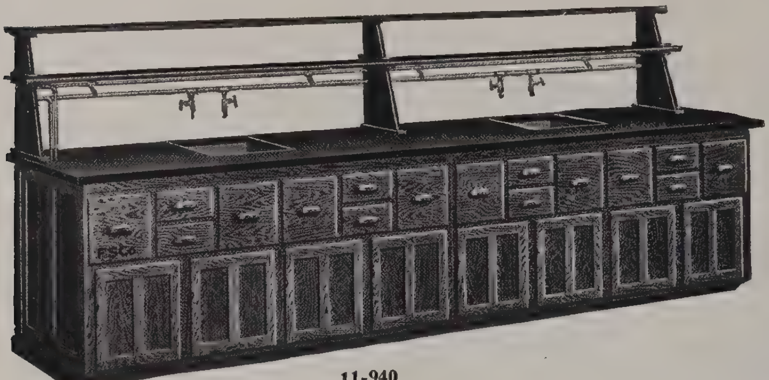
11-925. CHEMISTRY TABLE, Double; similar to No. **11-920**, with **wood top**, but **without locks.** **Each, $407.00**

11-930. CHEMISTRY TABLE, Double; similar to No. 11-920, but with 1¼ inch **soapstone top** which is quite desirable; **with master-keyed locks.** Weight, 2,600 pounds. **Each, $479.00**

11-935. CHEMISTRY TABLE, Double; similar to No. 11-920, but with 1¼ inch **soapstone top** which is quite desirable; **without locks.** **Each, $431.00**

SINGLE CHEMISTRY TABLES

WITH TWO CENTER-SINKS



11-940
See also No. 11-945,
No. 11-950 and No. 11-955

11-940. CHEMISTRY TABLE, Single. This table is the same style as No. 11-920, but is designed to be placed along the wall. It accommodates eight (8) students, working in two (2) sections of four (4) each.

SPECIFICATIONS

Size. 12 feet long by 27 inches wide by 3 feet high.

Top. 1⅝ inches thick birch, matched, glued, dressed, and cleated to prevent warping.

Material and Construction. Table is made of selected oak, constructed with mortise and tenon joints to stand hard service. Doors and drawers are made with lap fronts in order to exclude dust. Drawers are of tenon and groove construction, with maple sides, full framed-in bottoms, and extension at back to safeguard against dropping when pulled out. Reagent shelves are made with retaining rims. Table is provided with toe space. Back of cupboard is removable in order to give free access to the waste pipes.

Drawers and Cupboards. Each student is provided with two (2) drawers and one (1) cupboard. Large drawers measure inside, 8¼ inches by 9¾ inches by 15 inches. Small drawers measure inside, 3¼ inches by 9¾ inches by 15 inches, and the cupboards measure inside, 18¾ inches by 16¼ inches by 17 inches. Each cupboard is equipped with one (1) shelf.

Locks. Drawers and doors are equipped with high grade master-keyed locks in sets of three (3). The three (3) locks are alike, but each set is different. Master key to pass all locks is furnished. Each set of locks is marked with a brass number plate.

Sinks. Two (2) soapstone sinks measuring inside, 6 inches deep by 14 inches by 16 inches, equipped with special acid resisting lead waste plugs and traps, and nickel-plated overflows with beehive strainers.

Plumbing. Plumbing consists of four (4) nickel-plated compression water cocks with detachable hose nipples (by removing the hose nipple, a Richard's filter pump can be attached), and with four (4) nickel-plated needle point gas cocks with galvanized iron piping to floor. Exposed piping is aluminum bronze. Each line is furnished with a shut-off valve near the floor.

Finish. Birch tops and reagent shelves are treated acid proof. Other exposed parts are finished standard light oak with one (1) coat of filler and three (3) coats of varnish, rubbed. Inside of drawers and cupboards is varnished.

Weight. Crated, with wood top, 1,100 pounds. Tables are shipped in sections.

No. 11-940 Table, with **wood top** and **master-keyed locks**........................**Each, $265.00**

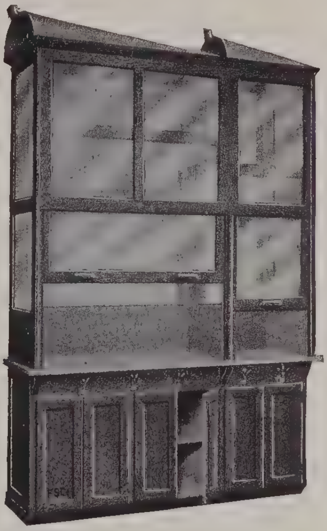
11-945. CHEMISTRY TABLE, Single; similar to No. 11-940, with **wood top,** but **without locks.** **Each, $241.00**

11-950. CHEMISTRY TABLE, Single; similar to No. 11-940, but with 1¼ inch **soapstone top** which is quite desirable; **with master-keyed locks.** Weight, 1,450 pounds. **Each, $278.50**

11-955. CHEMISTRY TABLE, Single; similar to No. 11-940, but with 1¼ inch **soapstone top** which is quite desirable; **without locks.** **Each, $254.50**

OTHER STYLES OF TABLES
FOR
PHYSICS AND DOMESTIC SCIENCE
can also be supplied

11-960
See also No. 11-965



11-970
See also No. 11-975

11-960. LABORATORY TABLE, Plain Type; with four (4) drawers. This is a simple and substantial table for general laboratory use where plumbing is not necessary, or for chemical use where other plumbing is near by.

Size. 5 feet, 9 inches long by 3 feet, 6 inches wide by 2 feet, 6 inches high.

Top. 1⅝ inches thick birch, matched, glued, and dressed.

Material and Construction. Table is made of selected oak and solidly constructed to stand hard service. Legs are fastened to body of table with braces and bolts. Drawers are made with lap fronts in order to exclude dust. They are of tenon and groove construction, with maple sides, full framed-in bottoms, and extension at back to safeguard against dropping when pulled out. Top extends over the rail 2½ inches, allowing use of various clamps.

Drawers. Four (4), measuring inside, 3¼ inches by 21 inches by 15 inches.

Locks. When ordered with locks, drawers are equipped with high grade master-keyed locks, all different. Master key to pass all locks is furnished. Each lock is marked with a brass number plate.

Finish. Top is treated acid proof. The lower part is finished standard light oak with one (1) coat of filler and three (3) coats of varnish, rubbed. Inside of drawers is varnished.

Weight. Crated, 275 pounds. Table is shipped knocked down.

With master-keyed locks, Each, $57.75

11-965. LABORATORY TABLE, Plain Type; similar to No. 11-960, with four (4) drawers, but **without locks.** **Each, $53.75**

11-970. CHEMISTRY FUME HOOD. Instead of exhausting the fumes from the center, as in former construction, the present method is to exhaust the fumes from the end outlet by connecting to flues. The top is made from terne plate. The hood is lined to a height of 12 inches from stone top with transite asbestos, which is water and acid proof.

Size. 6 feet long by 2 feet deep by 9 feet high.

Top. Soapstone, 1¼ inches thick.

Material and Construction. Hood is made of selected oak constructed with mortise and tenon joints, to stand hard service. The hood is divided into two (2) compartments with glass partition. The larger compartment being 4 feet and the smaller compartment 2 feet. Compartments are lined to a height of 12 inches from stone top with transite asbestos, which is water and acid proof. Lift doors are balanced on weights. Solid bronze chains are used. Cupboard doors are made with lap fronts. Glass is double strength, first quality.

Ventilation. Tops of hoods are terne plate, this material, being part lead, will withstand the acid fumes better than any other kind of metal. The tops are rounded and provided with outlets at the ends which are to be connected to chimney of flue. Draft may be assisted by gas burner placed in the upper part of the hood. A blower is recommended where heavy gases are generated and where a high velocity of air is required.

Plumbing. Plumbing consists of five (5) nickel-plated, needle point, gas cocks with piping complete to floor line. The gas cocks are placed on the front, with holes through the top, for hose connections. This arrangement permits the regulation of gas from the outside.

Finish. Outside of hood is finished standard light oak with one (1) coat of filler and three (3) coats of varnish, rubbed. Inside of compartments is aluminum bronzed.

Weight. Crated, 600 pounds. Hood **without a back** is shipped in sections. **Each, $203.50**

11-975. CHEMISTRY FUME HOOD, similar to No. 11-970, but made **with a back,** which is ¼ inch asbestos board. **Each, $231.00**

LABORATORY APPARATUS CASES

11-980
See also No. 11-985

OTHER STYLES
OF
STOOLS AND CHAIRS
can also be supplied

11-990
See note above

11-980. LABORATORY APPARATUS CASE, Eight (8) Feet Long; with sliding doors. This case is used in physical, chemical and biological laboratories for storing and displaying of large apparatus, and in storerooms for storage supplies. The upper part has adjustable shelves. Sliding doors are equipped with ball-bearing sheaves and move freely on steel track. The back of the case is paneled. The lower part has large drawers for various uses.

SPECIFICATIONS

Size. 8 feet long by 6½ feet high. The lower part is 28 inches deep by 20 inches high. The upper part is 17½ inches deep inside.

Material and Construction. Case is made of selected oak and of substantial construction. Back is paneled. Ends project beyond back sufficiently to allow scribing to wall. Case is made with toe space. Shelves in upper part are faced with oak and supported on standards and brackets arranged for a ½ inch adjustment in height. The doors are sliding, equipped with ball-bearing sheaves and move freely on brass-plated steel tracks. Each door is fitted with flush pull and lock. Glass is double strength, best quality. Drawers are made with lap fronts. They are made with tenon and groove construction, maple sides, full framed-in bottom and extension at back to safeguard against dropping when pulled out.

Drawers. In the 8 foot case the drawers measure, inside, 10¼ inches deep by 20¾ inches wide by 22½ inches long.

Locks. Drawers are furnished with high grade locks, all alike. Locks on upper doors are included in the prices.

Finish. Exposed parts are finished standard light oak with one (1) coat of filler and three (3) coats of varnish, rubbed. Inside of drawers is varnished. If specified on order, the inside of the upper section and shelves will be aluminum bronzed, otherwise varnished.

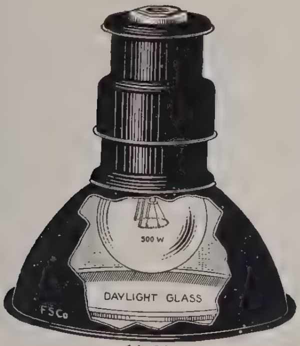
Weight. Crated, 850 pounds. Cases are shipped in sections.

This case, 8 feet long, **with locks** .... **Each, $187.50**

11-985. LABORATORY APPARATUS CASE, Five (5) feet long; similar to No. 11-980, but 5 feet long; with locks. Weight, 550 pounds. **Each, $125.00**

11-990. LABORATORY STOOLS. Made in three (3) different heights so one can be selected to be most convenient for its particular use. The use of these stools in the laboratory is the means of preventing considerable unnecessary fatigue. The seats are 13 inches diameter; they are made of elm, finished in light oak, and are substantially built.

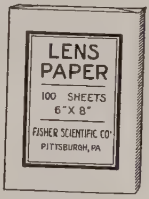
Height, inches	18	25	30
Each	**$4.00**	**5.25**	**5.75**



11-992

11-993

12-000



11-995

11-992. LAMP, Laboratory, Daylight. An efficient electric lamp which provides general illumination of the laboratory. The light from this lamp is spectroscopically identical with daylight. It is invaluable in laboratories where color matching of any kind is done, where color reactions are involved, or where titrations with indicators are made. This permits testing to be carried on under the same light conditions regardless of the weather conditions, time of the day or night.

The complete lamp consists of a holder containing the lamp socket with wires for attaching, and a clamp holder (inside) for holding the shade; it has a threaded connection for attaching directly to a ½ inch conduit; a detachable metal shade, 12 inches diameter, aluminum finished inside; a 500 watt gas filled electric lamp, and a detachable daylight filter, of glass convex shape, eleven (11) inches diameter. The entire metal fixture is finished in black enamel on the outside.

A. Complete, for 110 volts, **Each, $17.50**
B. Complete, for 220 volts, **Each, $18.00**

11-993. DAYLIGHT FILTERS, for No. 11-992 Lamp.. **Each, $9.50**

11-994. BULBS, Gas Filled, 500 watts; for use in No. 11-992 Lamp............**A.** For 110 volts, **Each, $ 2.00**
B. For 220 volts, **Each, $ 2.50**

LAMPS, Alcohol, see Burners, page 125.

LAMP, Colorimeter, see No. 7-265.

LAMPS, Microscope, see Microscopes, pages 445-446.

LECTURE APPARATUS, for Electrolysis, see No. 9-430 to No. 9-500.

11-995. LENS PAPER. A clean, soft paper which does not become harsh, does not readily collect dust or grease, and is free from impurities. It is made especially for cleaning lenses, and should be used for this purpose as other materials are apt to scratch the polish of the lens.

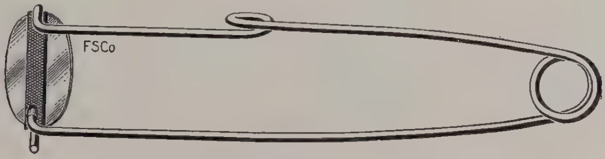
The sheets are a convenient size; 6 inches by 8 inches, and there are 100 sheets in a book.

Per pkg. (100 sheets), **$ .40**
Dozen pkgs., 10% discount.

LETTERS, of steel, for marking, see Dies No. 8-680.

12-000. LEVEL, Circular. Used with different laboratory apparatus that require leveling. The metal case is nickel-plated; outside diameter, 35 mm.

Each, $1.00



12-005

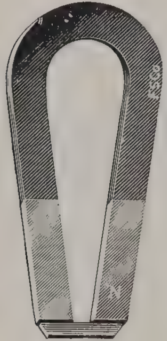
12-005. LIGHTER, for gas. A safe and convenient gas lighter which eliminates the use of matches in the laboratory. Sparks are made by the rubbing of the replaceable cerium-and-iron alloy tip, on a file. The tips require no adjusting. These lighters are now used extensively in laboratories.

Each, $ .15
Dozen lots, 10% discount.

12-010. TIPS, for No. 12-005 Lighter; made of cerium-iron alloy mounted in threaded brass heads; are replaced on the lighter in a few seconds.

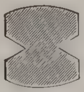
Per dozen, $ .80
Gross lots, 10% discount.

Magnets



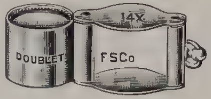
12-015

12-020



Cross-section of No. 12-025

12-025



12-030

12-035

12-015. MAGNETS, Horseshoe; made of steel, with the poles marked.

Length, inches	4	6
Each	$ .30	.50

12-020. MAGNETS, Bar; made of steel, with the poles marked.

Length, inches	4	6
Each	$ .35	.60

12-025. MAGNIFIERS, Coddington. Lens is made of a cylinder of glass with a deep groove cut in at an equal distance from the ends, and acts as a diaphragm. The ends of the cylinder are ground spherical to form the lens surfaces. They are mounted in nickel-plated metal cases which fold. The field of vision is smaller with the higher magnifications.

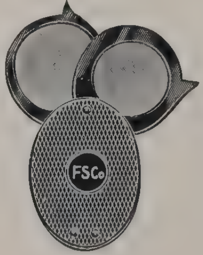
Magnification	7x	10x	14x
Diameter, mm	25	20	15
Focal length, mm	38	25	18
Each	$3.00	3.00	3.00

12-030. MAGNIFIER, Doublet, Folding; with two (2) separate plano-convex lenses, mounted in a nickel-plated metal case which folds. Magnification, 14x; diameter, 12 mm.; focal length, 18 mm. **Each, $2.00**

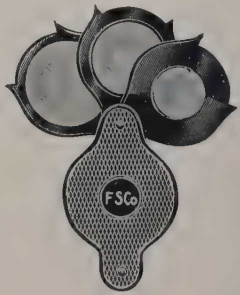
12-035. MAGNIFIER, Doublet, with handle; similar to No. 12-030 in construction of the lenses, the size and the focal length. This magnifier has a hexagonal nickel-plated metal handle which is 35 mm. long; this enables more convenient holding of the magnifier. **Each, $1.75**

DOUBLET MAGNIFIERS, for use with Dissecting Microscopes, see Microscopes, Dissecting page 451.

12-040



12-045

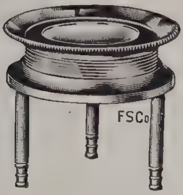


12-050

12-040. MAGNIFIER, Single, Vulcanite Mounting. A very convenient magnifier for carrying in the pocket. While the magnification is not as great as the preceding magnifiers, the field of vision is larger. Diameter of lens, 25 mm.; magnification, 4x. **Each, $1.10**

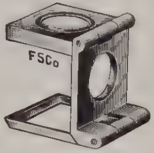
12-045. MAGNIFIER, Double, Vulcanite Mounting; with two (2) lenses, one (1) 20 mm. diameter and one (1) 25 mm. diameter. The lenses can be used singly or together. Magnifications, 4x to 8x. **Each, $2.00**

12-050. MAGNIFIER, Triple, Vulcanite Mounting; with three (3) lenses, 12 mm., 15 mm., and 18 mm. diameter. Lenses can be used singly or in combinations. Magnifications, 6x to 20x. **Each, $2.25**



12-055

12-060

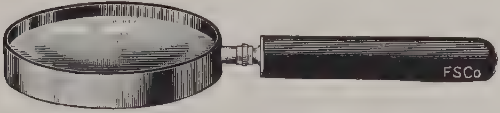


12-065

12-055. MAGNIFIER, Tripod. This magnifier gives a large field of vision, and is used extensively for elementary work in the different branches of Biology. The lens mounting screws into the tripod stand and is focused by turning. Diameter of lens, 25 mm.; magnification, 7½x.
Each, $ .80
Dozen lots, 10% discount.

12-060. MAGNIFIER, Counting Glass. Used extensively for counting bacteria; recommended by the American Public Health Association. Also used in other biological work. It has two (2) plano-convex lenses which give a flatter and better image than one (1) lens. Diameter of lens, 40 mm.; magnification, 3½x.
Each, $4.00

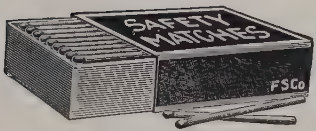
12-065. MAGNIFIER, Linen Tester. Used for counting the threads in fabrics and for elementary students' work in the different branches of Biology. The magnifier folds flat, and can be conveniently carried. The opening in the base is ½ x ½ inch.
Each, $ .65
Dozen lots, 10% discount.



12-070

12-070. MAGNIFIER, Reading Glasses. Used for examining a large field under low magnification. The lenses are held in a nickel-plated rim; provided with black finished handles.

Diameter of lens, inches	2	3	4
Each	**$ .85**	**1.20**	**2.00**



12-075

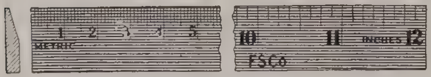
12-080

12-075. MATCHES, Safety; in small paper-covered wooden boxes. In small packages of one (1) dozen boxes, and large packages of one (1) gross boxes.
Per dozen boxes, **$ .18**
Per gross boxes, **$1.60**

12-080. MEASURES, Agateware; made of nickel steel completely covered with baked agate enamel. Will withstand rougher usage; used for approximate measuring, and for dispensing.

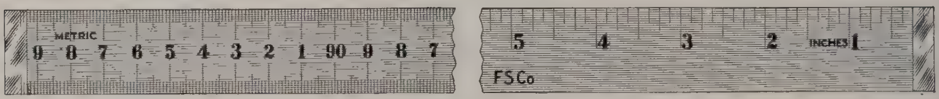
Capacity, quarts	1	2	4
Each	**$1.10**	**1.50**	**2.10**

MEASURES of glass, see Graduates, page 402, also Cylinders, page 285



12-085

12-090



12-095

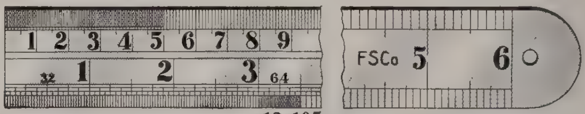
12-085. MEASURE, Boxwood Rule. Graduated on one side to 12 inches, in sixteenth of an inch divisions. Graduated on the other side to 300 mm., in 1 mm. divisions. The illustration shows parts of both sides of the measure. **Each, $ .18**
Per dozen, $1.60

MEASURE, Celluloid Rule, See No. 9-025, page 302.

12-090. MEASURE, Maple Rule. Double beveled, 12½ inches long; with metric and inch scales on the same side. Graduated to 12 inches in sixteenth of an inch divisions, and to 300 mm. in 1 mm. divisions. **Each, $ .25**
Per dozen, $2.20

12-095. MEASURE, Meter Stick, Brass Ends; made of hard maple; one side is scaled in centimeters, divided in millimeters on both edges. The other side is scaled in inches, and divided in eighths of an inch. Length, 100 cm.; 5⁄16 inch thick, with brass bound ends. The illustration shows parts of both sides of the measure. **Each, $ .60**
Per dozen, $6.00

12-100

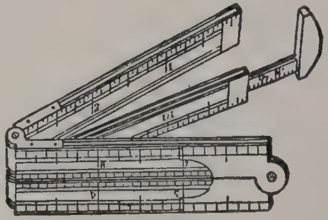


12-105

12-100. MEASURE, Chemists' Pocket Rule. A convenient vest pocket rule for the chemist, made of steel. Graduated to 12 inches in eighths and sixteenths of an inch divisions on one side. Graduated in sixteenths, thirty-seconds and sixty-fourths of an inch, also one-half millimeters and one (1) millimeters on the other side. Threefold; supplied in metal bound leather case. **Each, $1.20**

12-105. MEASURE, Steel. Length 6 inches. Divided in sixteenths, thirty-seconds, sixty-fourths of an inch, also millimeters and one-half millimeters, on one side. Divided in twelfths, twenty-fourths, forty-eighths, ninety-sixths of an inch, also tenths, fortieths, fiftieths and one hundredths of an inch on the other side. Width of rule, ¾ inch. The illustration shows parts of both sides of the measure. **Each, $ .60**

12-110



12-115

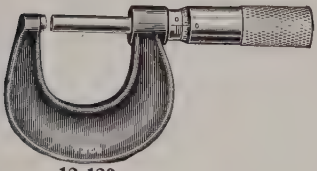
12-110. MEASURES, Steel Tape; in nickel-plated metal cases. Graduated on one side in sixteenths of an inch, and on the other side in millimeters.

The two (2) meter tape is rewound by a spring; the five (5) meter tape is rewound by hand.

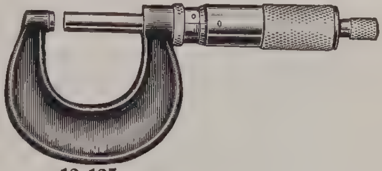
Length, meters	2	5
Length, feet	6	15
Each	**$1.50**	**3.50**

12-115. MEASURE, Caliper Rule, Folding. Boxwood rule graduated on one side in twelfths and sixteenths of an inch, and on the other side in millimeters. Fourfold; 12 inches long when open; with graduated caliper slide made of brass. **Each, $1.25**

MEASURES—CALIPERS



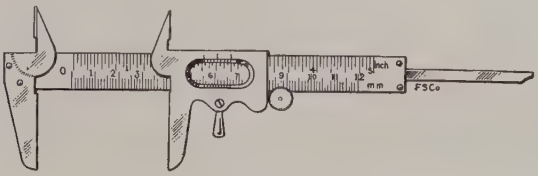
12-120



12-125

12-120. MICROMETER CALIPER, with drop-forged steel frame; measuring surfaces are hardened to prevent wear. Range, 0 to 25 mm.; reads to 0.01 mm. **Each, $6.00**

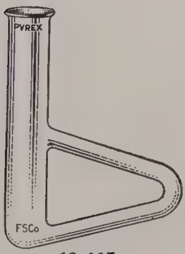
12-125. MICROMETER CALIPER, with ratchet stop. This caliper is similar to No. 12-120, but is provided with a ratchet stop which slips when the proper pressure is applied, and thereby reduces all measurements to the same pressure. Measurements obtained are more accurate than those taken with calipers which rely on the sense of touch. Range, 0 to 25 mm.; reads to 0.01 mm. **Each, $8.00**



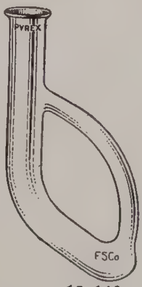
12-130

12-130. CALIPER, Inside and Outside. Range, 0 to 5 inches, and 0 to 120 mm.; with vernier which enables measurements to be made to one hundred-twenty-eighths ($\frac{1}{128}$) of an inch and one-tenths of a millimeter. The caliper has a roller adjustment, which is conveniently operated by the thumb; it also has a lock to preserve the adjustment while reading, or in using it as a gauge. **Each, $3.00**

MEAT CHOPPER, see No. 8-490 under Crushers and Grinders.



12-135



12-140

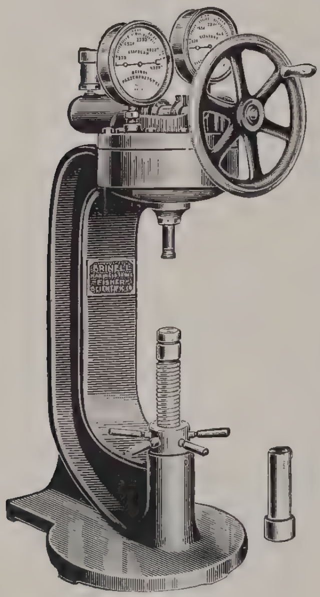
12-135. MELTING POINT TUBE, Thiele, Pyrex Glass. The usual form tube for determining the melting point of organic substances. Tube, 150 mm. long; large diameter, 25 mm. **Each, $1.20**

12-140. MELTING POINT TUBE, Thiele-Dennis, Pyrex Glass. A modified Thiele tube, designed to accelerate the circulation of sulphuric acid through the tube with a resulting equalization of temperature and accuracy in results. See *Journal of Industrial and Engineering Chemistry, April, 1920.* **Each, $1.50**

MELTING POINT APPARATUS, for Parawax, see Petroleum Products Testing Apparatus, page 491.

METABOLISM APPARATUS, see No. 5-900 under Clinical Diagnostic Apparatus, page 193.

METALLURGICAL TESTING APPARATUS



12-150

FISHER
BRINELL-HARDNESS
TESTER

Patented
November, 1919

12-150. BRINELL HARDNESS TESTER, Fisher (*Patented November, 1919*). This is the standard American Brinell Tester which was designed by our own engineers, and is built in our Instrument Shop. It has many features which contribute to its satisfactory operation; these features are explained in the following description. It is the most universally used Hardness Tester, and has been adopted by over one hundred (100) of the largest manufacturing concerns in the United States, some of whom have from two (2) to ten (10) machines in operation.

The Brinell Method is that of measuring the indentation made by a hardened steel ball when pressed by a given pressure into the metal to be tested. The Brinell hardness value is the ratio of the pressure applied to the area of the spherical indentation. These values are obtained directly from a table supplied with this tester. The Brinell Method is the International Standard Method of measuring hardness, and specifications of metals to meet various needs, usually carry Brinell hardness requirements. Other methods of tests have been devised which will give comparative results, but cannot be interchanged for different metals or different alloys of the same metals. Results obtained with different Fisher Brinell Testers are interchangeable, and more materials have been bought, sold, and accepted on the results of hardness tests made by the Fisher Brinell Tester, than by any other tester.

DESCRIPTION

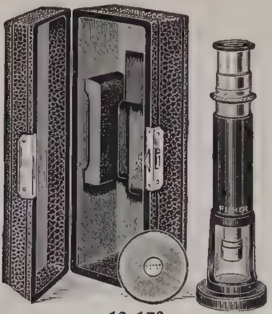
The Fisher Brinell Hardness Tester was perfected after many years of experience in the manufacture of hardness testers, and considerable experimental investigation. It is a hydraulic press of the "C" clamp design, in the head of which is a ram carrying a hardened steel ball 10 mm. diameter. The hydraulic pressure is transmitted to this ram from the compressor in the head of the machine, which is operated by a screw, fitted with a hand wheel. About 1½ turns of the hand wheel will produce 3000 kilos pressure on the ball.

The diameter of the ram is 8 inches, therefore the hydraulic pressure exerted per square inch is very low. **A replaceable rubber diaphragm** fitted over top of the ram, expands as the ram moves downward, and returns to its original position when the pressure is relieved. This is a patented feature of this tester, which does away with the necessity of a ground cylinder and piston, and is very practical as the movement of the ram is quite small.

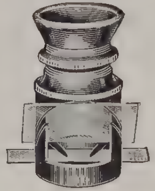
In other types of testers, the ground ram causes friction when it fits tightly, and leakage of the hydraulic fluid when it fits loosely, which is always the case when it becomes worn.

The anvil on which the piece to be tested, rests, is adjustable for height so that pieces from 3/16 inch to 12 inches may be accommodated. The anvil is flat on top but convex on the bottom, and adjusts itself to irregular shaped pieces.

There are two (2) pressure gauges on the head of the machine, one (1) of which has a needle valve connection, and is used as a check-gauge so that the accuracy of the other gauge, which is used for routine tests, may be checked at any time. On account of this low pressure per unit area, and the fact that the pressure is exerted gradually, the gauges cannot be strained in routine work.



12-170



12-175

(*BRINELL HARDNESS TESTER, Fisher—Continued*)

ADVANTAGES

With this machine the pressure is applied gradually and uniformly, not in pulsations. Many tests showed that pressure applied by means of a lever pump will produce a greater indentation of the ball than an equivalent pressure applied uniformly, because the pulsations have the same effect as blows.

In this machine the ram has a floating fit in the cylinder, and the rubber diaphragm prevents leakage of the hydraulic fluid. *This is a patented feature.*

The cylinder in which the pressure is generated is cast in the head of this machine; all piping is eliminated which reduces the liability of leakage or damage from this cause.

The table furnished with the tester enables the operator to read the Brinell numeral, after the diameter of indentation is measured, without any calculating.

TO MAKE A TEST

The spot at which the test is to be made should be flat. If the piece to be tested does not offer a convenient flat surface, a small spot about 10 mm. in diameter should be ground or filed flat. When a large number of irregular shaped pieces are to be tested, a small grinding wheel attached to a flexible shaft will be found very convenient for this grinding.

Place the piece to be tested on the leveling stage. Turn the nut until the test piece makes contact with the ball. In this position the flat test spot should be in the horizontal plane.

Apply the pressure by turning the hand wheel clockwise, until the pressure gauge indicates 3000 kilos for hard metals, or 500 kilos for soft metals. Allow the pressure to remain at this point for thirty (30) seconds and then turn the hand wheel counter clockwise as far as it will turn, so that the ram will return to the original zero position. Remove the test piece and read the diameter of the indentation made by the ball, with a suitable microscope. (See Measuring Devices, No. 12-170 to No. 12-180, inclusive.) By referring to the Brinell table, the hardness numeral for every diameter, for both 3000 kilos and 500 kilos, will be found.

The machine is supplied with directions for adding glycerine (the hydraulic liquid), for replacing a rubber diaphragm, and for operating. For extra balls, see No. 12-155 and No. 12-160. For devices for measuring the indentations, see No. 12-170, No. 12-175, and No. 12-180.

No. 12-150 Fisher Brinell Tester weighs 500 pounds, and is shipped in a special crate made of heavy lumber tied with steel bolts; carrying-arms project front and back at a convenient height so that two men can carry it. Supplied without Reading Microscope. **Each, $350.00**

12-155. BRINELL BALLS, for No. 12-150 Tester; 10 mm. diameter. The usual Brinell Ball made of hardened alloy steel. **Each, $ .25**

12-160. BRINELL BALLS, Special, for No. 12-150 Tester; 10 mm. diameter. This is a harder and more durable ball; hardened by cold working and heat treating. It is recommended for hard use and for indentations in hard metals with Brinell values from 500 to 700. **Each, $ .50**

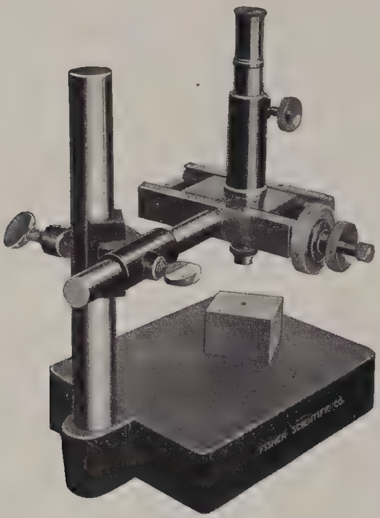
12-165. RUBBER DIAPHRAGM, for No. 12-150 Brinell Tester. Readily replaced by the operator. **Each, $3.00**

12-170. BRINELL MICROSCOPE, for use with No. 12-150 Brinell Tester. The most used instrument for measuring the diameter of the impressions made in the Brinell Ball Test; it was designed especially for this purpose. It is a compound microscope and permits more accurate measurements than can be made with a magnifier.

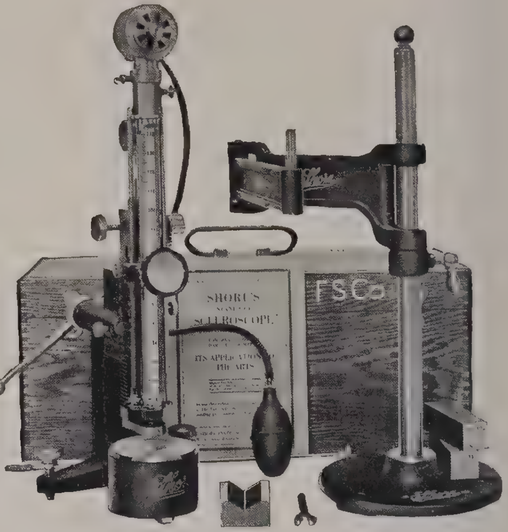
The Brinell Microscope consists of a body tube on a circular base, which has a 14 mm. aperture for viewing the specimen. The interior of the body tube surrounding the cut-out portion is finished in white enamel to increase the illumination of the specimen. Sliding in the body tube is a focusing tube carrying a Ramsden eyepiece and 32 mm. achromatic objective. When sent out, this tube is set so that the objective is focused on field; this position is readily reset.

The microscope tube is fitted with a scale so spaced as to read directly to 7 mm. in divisions of tenths of a millimeter, with every mm. line longer than the others and numbered. A stage-scale of metal is also supplied with ruling in single mm., 7 mm. long for comparison with eyepiece scale to provide for recalibration from time to time, if necessary. The instrument is supplied in a leatherette case. **Each, $35.00**

12-175. BRINELL MAGNIFIER, for use with No. 12-150 Brinell Tester. This handy device consists of a magnifying lens and a small steel rule graduated in fifths of a millimeter. The instrument is held in one hand, while the indented specimen, with the impression upwards, is held against the divided steel rule which is fitted in the bottom of a metal cylinder, on which the lens is mounted. Readings can thus be made to $\frac{1}{10}$ of a millimeter. Complete instrument, including graduated steel rule. **Each, $12.00**



12-180



12-185
See also No. 12-190

12-180. MICROMETER MICROSCOPE, for very accurate measurements of Brinell indentations, or for other measuring purposes. This precision instrument combines optical and mechanical means to measure and to show directly the diameter of Brinell indentations to 0.01 mm. It consists mainly of a microscope having achromatic objective (42 mm. focus), ocular with stationary cross-hairs, and rack and pinion movement for focusing, mounted in a graduated sliding brass plate moved horizontally by means of a graduated micrometer screw. In order to obtain accurate measurements, the microscope is adjusted to show the left and the right side of the indentation in equally sharp focus, the joint of the cross-hairs is then set against one side of the indentation and the position of graduated slide and micrometer screw noted.

The joint of the cross-hairs is then moved across the center of the indentation to the other side, the position of slide and micrometer screw is again noted, and the difference shows the width with an **accuracy of 0.01 millimeter.** The whole arrangement is mounted on a very heavy and substantial universal support, so that measurements can be taken on small specimens as well as on very large pieces of irregular shape. Height of support, 12 inches; length of side arm, 8 inches. Complete instrument, including objective and eyepiece. **Each, $100.00**

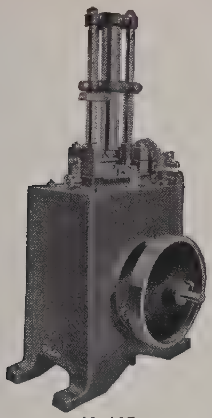
12-185. SCLEROSCOPE, Hardness Tester. Measures hardness by the "rebound" or "elastic reaction" method. The instrument consists mainly of a pointed hammer which falls from a definite height, through a glass tube, upon the metal to be tested. The height to which the hammer rebounds is taken as the measure of the hardness and is read directly from a scale placed back of the glass tube which is about 10 inches high. The average hardness of properly hardened carbon tool steel is taken as standard for the "100 point" of the scale. Pure lead will show a hardness of 2, brass about 15 (meaning that the hardness of lead is 2 per cent, of brass 15 per cent, of that of hardened carbon tool steel.) Two (2) carefully tested reference blocks of metal, one (1) of hardened steel for checking the upper part of the scale, and one (1) of annealed brass for checking the lower range, are furnished with each outfit.

Application. The scleroscope has many applications, and for testing hardness under some conditions, it is the only instrument which can be used. It is adapted for testing the hardness of very large pieces, such as rails, chilled rolls, etc., also thin strips which do not have sufficient thickness to make Brinell indentations. It is also adapted for testing finished pieces, such as gears, rings, axles, nuts, and other automobile parts. The test does not deform the piece tested.

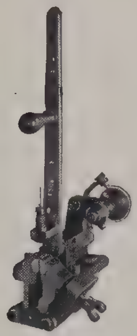
It can be used mounted on the support with anvil base as illustrated. It can be removed from this support and attached to the adjustable arm of the other support illustrated, and the articles held in a vise while being tested. It can also be used without any support, in which case it is held with one hand and rested on any portion of a large article to be tested.

This equipment consists of scleroscope with universal hammer, on support with anvil; a support post with swing-arm; one (1) magnifier hammer; one (1) soft and one (1) hard steel reference bars; one (1) plaster mount vessel; fifty (50) charts; complete directions for using and a hardwood carrying case. **Each, $275.00**

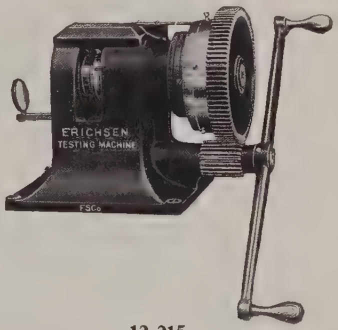
12-190. SCLEROSCOPE, Recording, Hardness Tester. A new form of scleroscope which is more easily operated. This instrument operates in the same manner as No. 12-185, excepting that the rebound of the hammer is automatically recorded on the dial on the top of the scleroscope. It employs the universal hammer only, as the magnifier hammer is not needed with the rebound measuring device. Otherwise, the equipment supplied is the same as that supplied with No. 12-185 Scleroscope. **Each, $285.00**



12-195



12-200



12-215

12-195. FATIGUE OR ENDURANCE TESTER, Repeated Impact, Eden-Foster. In order to obtain reliable and consistent results in impact fatigue tests it is essential that the true energy of the impact blows should be calculable with accuracy. This is possible with this tester, because the hammer falls exactly vertically, striking the specimen at 90 degrees; this hammer is free from attachments and falls by its own weight. Another feature is the rigidity of the base of this machine; this eliminates vibrations, which, if permitted, would materially affect the results. The actual height of the fall may be easily and conveniently measured, so that the true energy of blow is calculable to a high degree of accuracy.

The operation of this machine will be clear from the illustration. The specimen is automatically rotated through 180 degrees between successive blows, the movement beginning and ending between the blows. The number of revolutions of the specimen, is indicated by an automatic counter, and the machine stops automatically when the specimen breaks. Only $\frac{1}{10}$ H.P. is required to drive the machine. The hammer with hardened steel face, is lifted by a cam movement and is guided in its free drop by two (2) sets of three point screws. The height of drop, which is adjustable from one (1) inch to 4½ inches, depends upon the position of the arrest. To permit a wide range of tests, two (2) interchangeable hammers are provided, weighing 5 pounds and 2 pounds respectively. Using the 5 pound hammer, the main shaft may be driven at any speed up to 60 r.p.m.; this gives sixty (60) blows per minute. Using the 2 pound hammer, speeds up to 90 r.p.m. (giving ninety (90) blows per minute), can be used.

Eden-Foster Tester, with driving pulley 8 x 1 inches, including special tool for turning semicircular groove in the specimen. Weight, 115 pounds. **Each, $475.00**

12-200. BRITTLENESS TESTER, Repeated Bending; for testing wires and metal strips. In order to investigate the ductility and detect brittleness of wires and metal strips, the specimen is bent backwards and forwards, through 180 degrees, over dies of definite radii, until fracture occurs, and the number of bends required to fracture, is automatically counted. This number represents the test result.

This apparatus has been developed especially to carry out repeated bending test. It is suitable for testing wires (ferrous and non-ferrous) of normal thickness, up to ¼ inch diameter, also for very thin wires and metal strips. For consistent results, the radius of the interchangeable mandrels over which the specimen is being bent should be equal to approximately twice the thickness of the specimen. The number of complete bending operations carried out before fracture of the specimen, is shown directly by an automatic counter which forms a part of the apparatus. Mandrels of 2, 4, 6, 8 mm. radius of curvature are included in the standard equipment.

Tester with standard equipment for wires of normal thickness, up to ¼ inch, and for metal strips up to $1\frac{3}{16}$ inches wide or ⅛ inch thick, with four (4) mandrels. **Each, $100.00**

12-205. ATTACHMENT, for gripping very thin wires up to .08 inch; tension adjustable to a maximum of 13 pounds. **Each, $30.00**

12-210. ATTACHMENT, for gripping very thin metal strips. Pieces up to 1 mm. thick by 30 mm. wide can be tested; tension adjustable to a maximum of 13 pounds. **Each, $40.00**

12-215. SHEET METAL TESTER, Erichsen; for determining the working qualities such as **drawing, stamping, and folding.**

The specimen of sheet or strip is clamped between two (2) dies and held in a way that permits the metal to flow, while a plunger with a hemispherical end is pressed against the specimen. The plunger, actuated by a micrometer screw, gradually moves forward until fracture occurs. The test piece is conveniently observed in the mirror attached to the tester. The depth of the impression required to cause fracture, is read directly on the graduated scale on the machine, to 0.01 mm. These readings are called "Erichsen Values" and are interchangeable and can be reproduced on any Erichsen Tester.

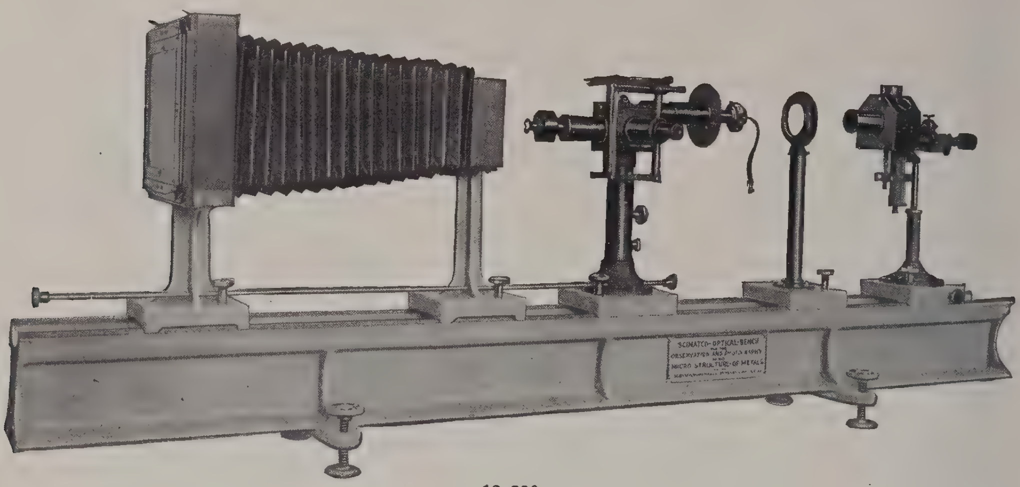
This tester also provides a means of very accurately measuring the thickness of the sheet, which is very important. In addition to the "Erichsen Value," this test also gives valuable information which is obtained by noting the formation of the fracture, the condition of the surface, etc.

The Erichsen Tester for accommodating test pieces 3½ x 3½ inches, with a thickness of from 0.1 to 3 mm. Net weight, 95 pounds. **Each, $300.00**

12-216. DIES, for No. 12-215 Tester; for metal strips up to one (1) inch wide.................. ......**Each, $ 50.00**

12-217. DIES, for No. 12-215 Tester; for metal strips up to $\frac{5}{16}$ inch wide. ....**Each, $ 50.00**

12-218. DIES, for No. 12-215 Tester; for testing wires................... ....**Each, $ 60.00**



12-220

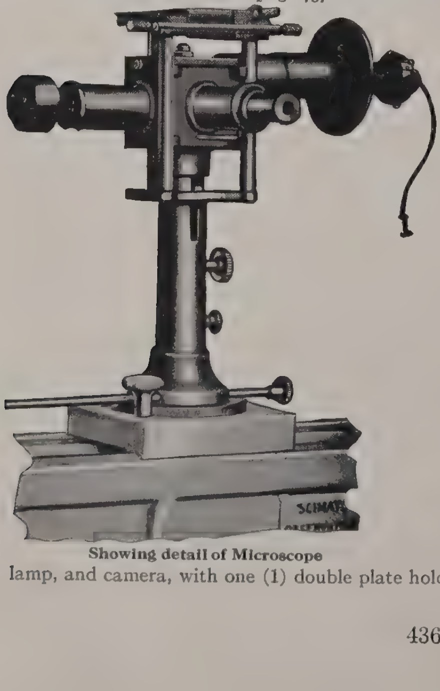
12-220. OPTICAL BENCH, Scimatco, for the Examination and Photography of the Micro-Structure of Metals. A very substantial equipment which is not easily thrown out of adjustment, and is arranged for convenient operation. It is used by the largest iron and steel manufacturers, such as American Sheet & Tin Plate Company, Atlas Crucible Steel Company, Bethlehem Steel Company, Carnegie Steel Company, Illinois Steel Company, Inland Steel Company, Youngstown Sheet and Tube Company, and others.

The regular equipment consists of a substantial cast-iron I-Beam type bench, 6 feet long, weighing 160 pounds, with adjustable leveling feet, and having two (2) ground rails similar to the ways of a lathe, which insure perfect alignment of the parts mounted thereon.

A new straight-pillar microscope sufficiently substantial to carry a whole section of a rail, with the mechanism for the coarse and fine adjustment enclosed in the column.

A condensing lens carried on a separate column, in which the height is fixed. A hand-fed arc lamp with a vertical and a horizontal adjustment. This lamp can be operated on alternating or direct current; on 110 volt or 220 volt current, with suitable rheostat. A specially constructed camera, capable of taking plates 6½ x 8½ inches, 5 x 7 inches, and 4 x 5 inches. The bellow extension is 25 inches.

The range of magnification, using the objectives and eyepieces listed, is from 28 to 3168 diameters. See *Magnification Table on page 437.*



Showing detail of Microscope

The Microscope furnished with the Scimatco Optical Bench is the inverted type of new design, having a substantial column 1⅞ inches in diameter, in which the coarse and fine focusing adjustments are enclosed.

A bronze optical housing is mounted on the top of the column. This carries the illuminating tube, the observation tube and the tube for projecting the image into the camera. This housing contains the reflecting prism and also carries the illuminating system.

One position of the prism projects the image into the observation tube. After the proper field has been found, the prism is turned by means of the lever and the same image is projected into the camera.

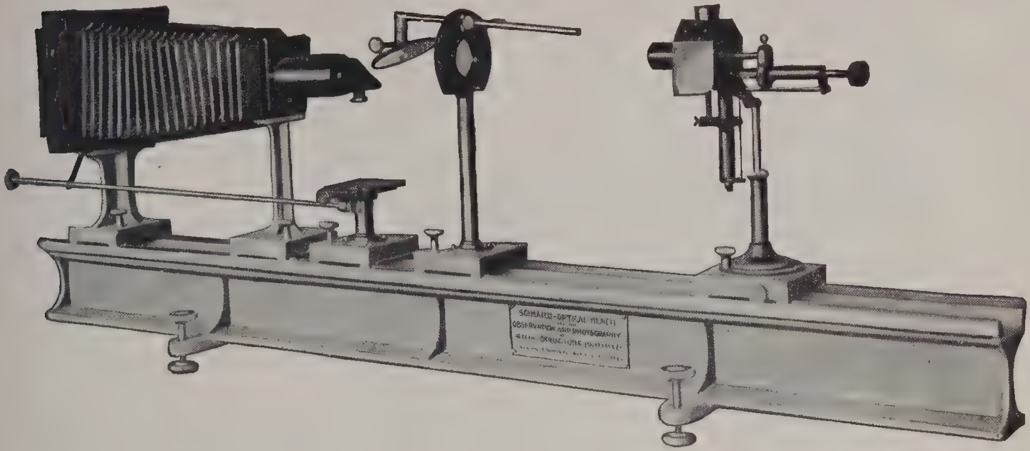
The Mechanical Stage is of flat plate design, having two (2) motions at right angles to each other. On account of its design it is not necessary to place the specimen to be photographed in a clamping device; simply place it on top of the stage.

The stage is supported on three (3) columns, each column having two (2) bearings, one at the top and one at the bottom of the bronze prism housing. This makes a very rigid and substantial stage, which cannot get out of alignment even when very heavy specimens are placed thereon.

The Illuminating Tube is provided with a holder for light filters, a diaphragm, and a photographic shutter. The illuminating system consists of condensing lens, glass plate, and light filter.

Scimatco Optical Bench Equipment, with bench, microscope, mechanical stage, condensing lens, arc lamp, and camera, with one (1) double plate holder, without objectives, eyepieces, or rheostat.

Each, $600.00



12-250 Macro Attachment, mounted on No. 12-220 Optical Bench

TABLE OF MAGNIFICATIONS FOR NO. 12-220 OPTICAL BENCH

Projection Eyepiece No. 12-235	Objective No. 12-225	Magnifications in Diameters at Minimum Bellows Extension	Magnifications in Diameters at Maximum Bellows Extension
5 x	1.8 mm	484	1848
5 x	4 mm	220	840
5 x	8 mm	110	420
5 x	16 mm	55	220
5 x	32 mm	28	110
10 x	1.8 mm	880	3168
10 x	4 mm	400	1440
10 x	8 mm	200	720
10 x	16 mm	100	360
10 x	32 mm	50	180

For lower Magnifications than above, the No. 12-250 Macro Attachment is recommended.

ACCESSORIES FOR NO. 12-220 OPTICAL BENCH

12-225. OBJECTIVES, for No. 12-220 Optical Bench. These are achromatic objectives, highly corrected, made for use without cover glasses, and give high degree of illumination. The 1.8 mm. objective is used for the highest degree of magnification; it is an oil immersion objective.

E. F. length, mm	32	16	8	4	1.8
Each	**$6.50**	**8.00**	**13.50**	**15.00**	**35.00**

12-230. OBSERVATION EYEPIECES, Compensated; for use in the observation tube of No. 12-220 Optical Bench.

Magnification	5x	10x
Each	**$6.00**	**8.50**

12-235. PROJECTION EYEPIECES, Compensated. Used to project the image onto the ground glass plate of the camera of No. 12-220 Optical Bench.

Magnification	5x	10x
Each	**$8.00**	**8.50**

12-240. RHEOSTAT, for use with the arc lamp on No. 12-220 Optical Bench.

For use on volts	110	220
Each	**$16.00**	**20.00**

12-245. PLATE HOLDER, Double; for 6½ x 8½ inch plates with kit for 5 x 7 inch plates, and kit for 4 x 5 inch plates. Used with the camera on the No. 12-220 Optical Bench. **Each, $6.00**

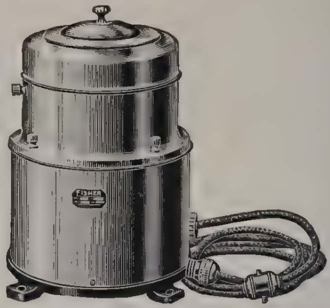
12-250. MACRO ATTACHMENT. Used with the No. 12-220 Optical Bench for examining and photographing large sections of metals under low magnifications of from 5 to 20 diameters. This equipment consists of an adapter, to be attached to the front of the camera, which carries a large reflecting prism and a 100 mm. large-field photographic objective. A separate supporting stage for the large specimens, with horizontal and vertical adjustments. A reflecting mirror for illuminating the specimen, with arm for attaching to the condensing lens support.

When the macro attachment is used, the microscope is removed from the bench and the macro stage put in its place; the condensing lens and the arc lamp are moved closer to the camera. Illustration shows the arrangement of the bench when the macro attachment is used. **Each, $360.00**

MICROSCOPE, Metallurgical, see also No. 12-490, page 452.

12-255

See also No. 12-260



12-265

See also Nos. 12-270 to 12-285 incl.

12-255. METALLOGRAPHIC, BELT AND DISC GRINDER, for Rough and Fine Grinding. This machine has been designed for the rapid grinding or surfacing of metal specimens.

In using this machine for the coarser grinding, the specimen is first held against the flat steel top over which the grinding belt runs at a speed of about 1,000 r.p.m. This will grind the specimen in straight parallel lines, and by turning the specimen at right angles on the same belt, crossing the rougher scratches first produced, a fairly flat surface is secured.

Three (3) different grades of belts are furnished with the machine. If the specimen to be surfaced is very rough, the coarsest belt should first be used, and then a finer grade. These belts are easily interchanged by raising the suspended metal cylinder and slipping the belt over the end pulleys. The grinding belt can again be tightened by dropping the cylinder. This suspended metal cylinder should be clamped upwards when the machine is not in operation in order not to stretch the belt. Width of grinding belt, 4 inches. Dimensions of the flat top of the machine, 10 inches long, 6 inches wide.

After the specimen has been first surfaced on the belt, a smoother surface can be produced by grinding it on No. 9-545 French Emery Paper attached to the disc on the side of this grinder. Diameter of disc wheel, 9 inches, which size can be cut from a single sheet of emery paper. The emery paper can be applied to the disc wheel very satisfactorily by using silicate of soda.

The machine is equipped with tight and loose pulley and a belt shifter for convenient operation. Very large metal specimens, such as sections of rails, shafts, etc., can be ground just as easily and perfectly flat as small specimens. Complete with three (3) grinding belts of different grades. **Each, $60.00**

12-260. GRINDING BELTS, for No. 12-255 Grinder. Endless belts, 4 inches wide with carefully graded abrasives. The tension pulley on the grinder is raised and these belts slipped on.

Grade	Very Coarse	Coarse	Medium	Fine	Very Fine
Each	**$ .60**	**.50**	**.50**	**.50**	**.50**

12-265. METALLOGRAPHIC POLISHER, Fisher, Motor Driven. An independent unit for preparing meta surfaces, with which separate heads can be used so that the same machine can be used for either fine grinding with No. 12-280 Grinding Head, or for polishing. The polisher consists of a vertical motor with a polishing disc directly connected to the motor shaft. Motor is mounted on a circular cast-iron base which has three (3) legs and holes for attaching to a table. Mounted on the base, and surrounding the motor, is a cylindrical nickel-plated brass housing. On top of this housing is bolted a nickel-plated copper bowl which completely surrounds the polishing head. This bowl is provided with a drain which draws off the polishing liquid caught in the bowl. It is also provided with a nickel-plated copper cover which protects the disc from dust, when not in use.

The polishing head is finished cast-iron with a hard rubber disc on top, which fits the shaft of the motor and is held by a set screw. The hard rubber disc is 6 inches diameter and is grooved on the edge for holding the polishing felt. The felt is clamped into the groove by a special counterbalanced clamping device which is very quickly attached or removed.

The motor can be operated on either 110 volts A. C. 60 cycle or D. C.; normal speed is about 1700 r.p.m.

Extra heads are quickly interchanged and are quite a convenience in preparing metal surfaces. Supplied with polishing head and felt disc; with cord, pendent-switch and plug. **Each, $120.00**

12-270. METALLOGRAPHIC POLISHER, Fisher, Pulley Drive. This machine is similar to No. 12-265 excepting that it has a 3 inch diameter grooved pulley instead of a motor. It can be used singly for polishing with the head supplied under this number, or for fine grinding with Head No. 12-280. Two (2) or more of these can be used side by side and all driven by one (1) power shaft or motor; in this way each machine can be retained for a separate operation, and routine work very much facilitated.

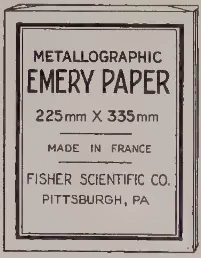
This polisher has the nickel-plated bowl with drain and cover similar to No. 12-265, and is equipped with a similar 6 inch polishing head. The polishing head spindle is provided with thrust bearings which prevent vibrations of the disc.

The pulley takes a $\frac{5}{16}$ inch round belt and requires $\frac{1}{8}$ H.P. The polisher is supplied with polishing head and felt disc; without belt. **Each, $75.00**

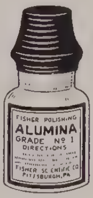
MOTOR, for No. 12-270 Polisher, see Motor No. 13-020, $\frac{1}{8}$ H.P., page 470.

12-275

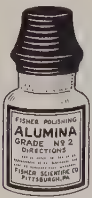
See also No. 12-280 and No. 12-285



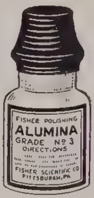
9-545



12-290



12-295



12-300

12-275. POLISHING HEAD, for No. 12-265 and No. 12-270 Fisher Polishers. A finished cast-iron head with a hard rubber disc on top, which fits the shafts of the Fisher Polishers and is held by a set screw. The hard rubber disc has a groove around the edge for clamping the felt which is held by the special adjustable counterbalanced clamp furnished with the polishers. **Each, $14.00**

12-280. GRINDING HEAD, for No. 12-265 and No. 12-270 Fisher Polishers. A finished cast-iron head which fits the shafts of the Fisher Polishers and is held by a set screw. Emery papers are attached to the flat top of this head by means of sodium silicate or other materials. **Each, $8.50**

12-285. POLISHING FELT DISCS, for use on No. 12-265 and No. 12-270 Fisher Polishers. These discs are 8 inches diameter, and are easily attached to the 6 inch polishing heads by means of the special counterbalanced ring-clamps supplied with the polishers. This material is particularly suited for polishing; it is strong, has a soft finish, and the texture is such that the levigated alumina embeds itself in it. **Each, $ .90**

Other sized felt discs can be supplied.

GRINDING AND POLISHING HEAD, see No. 13-015.

9-545. EMERY PAPER, French, Metallographic; in sheets 225 mm. x 335 mm. This is a special grade of emery paper, made in France and distributed to the Metallographic Laboratories in the United States by ourselves. It is recommended by the A.S.T.M. and in most of the newer books, for the preparation of metal specimens for micro-examination and photography. The material used for each grade of paper is specially prepared for this purpose and is carefully graded for uniformity.

The three (3) finest grades, No. 0000, No. 000, and No. 00 are recommended for the final grinding, before polishing with Fisher Levigated Alumina. The (finest) No. 0000 grade is used for the last grinding of softer metal specimens, the No. 000 grade for specimens of medium hardness, and the No. 00 grade for the final grinding of hard metals. The coarser grades are used for the different stages of preliminary grinding.

The No. 0000 is the finest grade, and the fineness of the other grades varies in the sequence in which they are listed.

Grade No.	0000	000	00	0	1	1G	2
Per 10 sheets	**$ .65**	**.60**	**.50**	**.50**	**.50**	**.50**	**.50**
Per 100 sheets	**$5.35**	**4.75**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**

FISHER LEVIGATED ALUMINA

FOR METALLOGRAPHIC POLISHING

This alumina is now recognized by the leading metallographists as the most satisfactory material for polishing metal surfaces for microscopical examination and photography, and is recommended in the newer text books on this subject. It produces a highly polished surface free from scratches, and does so without encasing the scratches. Polished surfaces produced by materials which encase scratches, show such scratches after being etched.

This alumina is carefully levigated. The levigated product is again graded into Grades No. 1, No. 2, and No. 3, and then chemically treated and prepared to make a product which has the proper degree of suspension, adhesion, and hardness. The polishing solutions made from the following grades of alumina are readily applied to the felt by means of a laboratory wash bottle, or a bottle with one-hole stopper and a glass tip.

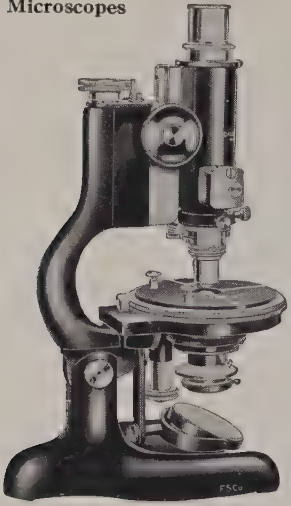
12-290. ALUMINA, Fisher, Polishing, Grade No. 1; for rapidly polishing hard steels and other hard metals. When using this alumina, the fine grinding can be stopped with the No. 00 French Emery Paper. One (1) ounce of this alumina and 49 ounces of distilled water, makes the correct polishing liquid. Supplied in sealed glass stoppered bottles.
Per 1 ounce bottle, $1.00
Per 4 ounce bottle, $3.60

12-295. ALUMINA, Fisher, Polishing, Grade No. 2; for polishing hard and medium hard metals, especially cast-iron, bronze, brass, and all copper and nickel alloys. This grade requires a little more time to polish than the No. 1 grade. One (1) ounce of this alumina and 99 ounces of distilled water, makes the correct polishing liquid. Supplied in sealed glass stoppered bottles.
Per 1 ounce bottle, $1.40
Per 4 ounce bottle, $5.20

12-300. ALUMINA, Fisher, Polishing, Grade No. 3; for polishing very soft metals, also for polishing any metal specimens for examination under very high magnification. This grade polishes more slowly than the No. 2 grade. One (1) ounce of this alumina and 150 ounces of distilled water, makes the correct polishing liquid. Supplied in sealed glass stoppered bottles.
Per 1 ounce bottle, $1.80
Per 4 ounce bottle, $6.80

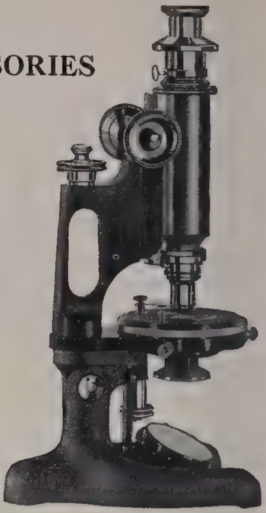
METRONOME, see No. 1-755, page 30.

MICROSCOPES AND ACCESSORIES



12-310

CHEMICAL
and
PETROGRAPHICAL
MICROSCOPES



12-305

12-305. MICROSCOPES, Chemical, Bausch & Lomb—Type M. This microscope is designed especially for chemical examinations.

The stage is circular and revolving, with a milled edge. It is graduated on the circumference in single degrees with every tenth line numbered and can be read conveniently by means of the pointer. The stage measures 88 mm. outside the graduations and 78 mm. inside. It has a vulcanite top that is provided with spring clips and centering screws.

The polarizer consists of a high-grade Nicol prism mounted with a revolving ring graduated in 2-degree divisions with every tenth line numbered. The polarizer has an indicating pointer. The entire mounting is securely supported in the substage and fixed for the zero point by a stud which engages a corresponding slot. **The analyzer** consists of a Glan-Thompson prism mounted in a revolving collar graduated in 2-degree divisions, with every tenth line numbered. The collar revolves smoothly in a cylindrical mounting which fits over the drawtube and is slotted to engage the stud for the zero point. The analyzer can be easily removed for insertion of the microscope eyepiece. **The eyepieces** are supplied with cross-hairs. A quick-changing nosepiece is supplied with sufficient rings for all of the objectives supplied with each outfit.

The microscopes are finished in black alcohol-proof lacquer. Each instrument is furnished in a hardwood cabinet fitted with lock and key.

Equipment designation	M2	M4
Cross-hair Eyepieces	10x—12.5x	5x—7.5x—10x—12.5x
Objectives, E.F., mm	16 — 8	32 —16 — 8
Objective Magnifications	10x—21x	4x —10x—21x
Each	**$156.00**	**182.00**

12-310. MICROSCOPES, Petrographical, Bausch & Lomb—Type LA. This instrument is the result of considerable development in the manufacture of petrographical microscopes. It is designed with a "stigmatic analyzer" made so that the faults in older models are entirely corrected. These faults were astigmatism and the difference in focus in the depth of the field. With this microscope rock crystal are shown with the image correct in every detail.

The polarizer is a Nicol prism in a revolving mount graduated into 2-degree parts with every tenth line numbered and having an indicating pointer. The entire mounting is supported in the substage and fixed for the zero point by a stud which engages the corresponding slot. The iris diaphragm is underneath.

The analyzer is a Glan-Thompson prism in a sliding prism box which allows withdrawal and return to the optical axis. The analyzer is provided with astigmatizing lenses to correct any distortion and to eliminate a shift of focus.

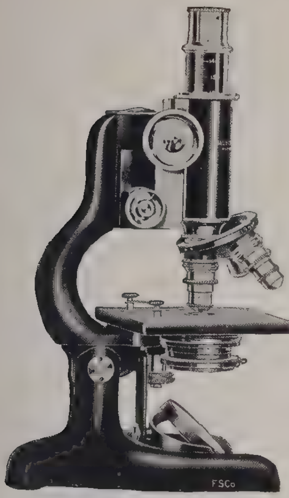
The stage is removable and measures 102 mm. diameter outside of the graduations and 90 mm. inside. The circumference is graduated in single degrees with each tenth line numbered. There is a double vernier which reads to one-tenth degree in both directions. The stage plate is vulcanite covered, having inlaid for orientation, two millimeter scales at right angles, 3 mm. long with each tenth line numbered. The substage carries the polarizer and a two-lens condenser in a swinging arm which provides a quick change from convergent to parallel light.

The microscope body tube takes the standard size eyepieces which are fitted with cross-hairs. Included with each outfit are one selenite plate (red of the first order), one quartz wedge, both mounted, also a pinhole cap which fits the draw tube for observing interference figures after the Lasaulx method.

The microscopes are finished in black alcohol-proof lacquer and all graduations are in nickel silver. Each instrument is supplied in a polished hardwood cabinet fitted with brass lock and key.

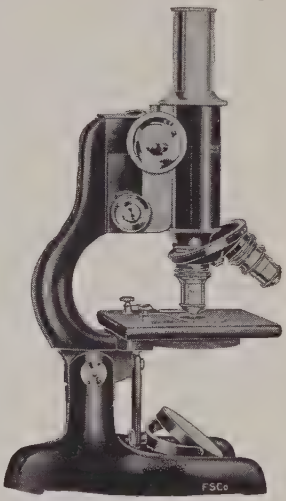
Equipment designation	LA 2	LA 4
Cross-hair Eyepieces	7.5x—10x	7.5x—10x—12.5x
Objectives, E.F., mm	16 — 4	32 16 — 4
Objective Magnifications	10x —45x	4x —10x—45x
Each	**$207.50**	**275.50**

We can also supply other models of Petrographical microscopes for research work, etc.



12-315

B. & L.
MICROSCOPES



12-320

12-315. MICROSCOPES, Bausch & Lomb—Type FFS, with Condenser. This type of microscope is the standard B. & L. instrument for general routine work in biological and pathological laboratories. **For high-power work,** the combination of the 10x Eyepiece and the 1.8 mm. Fluorite Oil Immersion Objective produces a magnification of **1000 diameters.**

The focusing is done by means of a coarse and a fine adjustment. The fine adjustment is of the lever type with micrometer heads on each side of the arm. One complete revolution of the micrometer heads produces a vertical movement of 0.25 mm. The fine adjustment ceases to operate when the objective touches the slide. **An automatic "take-up" for wear** prevents lost motion developing after continued use of the microscope. All parts of the fine adjustment are dust-proof.

The microscope stage is of metal, covered with vulcanized rubber, and measures 102 x 102 mm. There are two (2) spring clips to hold microscope slides or other flat objects. The condenser is of the Abbe type and is supplied with an iris diaphragm. The numerical aperture (N.A.) is 1.20. A circular blue glass acts as a ray-filter. The whole substage is adjustable for focus by a quick-acting screw.

The nosepiece revolves and will hold all objectives supplied with each outfit. This type of microscope is supplied with three (3) groupings of objectives. A double nosepiece is supplied with the FFS 6 equipment, and a triple nosepiece is supplied with the other two equipments. Immersion Oil and Dropping Bottles are furnished with the outfits containing Oil Immersion Objectives. All three groupings are supplied with the same two Huyghenian eyepieces, which are marked "5x" and "10x," according to their magnification when used as magnifiers. The Type FFS 8 Microscope is the one most used.

All objectives are achromatic except the fluorite objective (E.F. 1.8 mm.) supplied with FFS 10. For more exacting work, the advantage of the **fluorite objective** will be found in that the secondary spectrum is reduced so that the correction obtained for chromatic and spherical aberration is much better than the achromatic series and lies about halfway between the achromatic and the apochromatic.

The microscope stand is finished in black, alcohol-proof enamel, with the pinion and adjustment heads in lacquered brass. The base is connected to the pillar by means of a double-bearing inclination joint with both vertical and horizontal stops. Each microscope is supplied with a book of instructions and is fitted into a polished hardwood cabinet with brass lock and key.

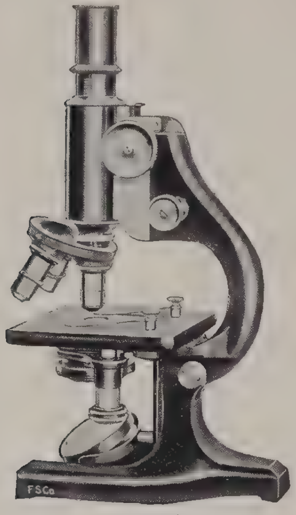
Equipment designation	FFS 6	FFS 8	FFS 10
Huyg. Eyepieces	5x—10x	5x—10x	5x— 10x
Objectives, E.F., mm.	16 — 4	16— 4 — 1.9	16 — 4 — 1.8
Objective Magnifications	10x—45x	10x—45x—97x	10x—45x—100x
Each	**$88.50**	**120.00**	**133.00**

12-320. MICROSCOPES, Bausch & Lomb—Type FS, without Condenser. This type of microscope is the one used in University, High School and other laboratories where **low-power work** is done and where no oil immersion objective is required. The combination of the 10x Eyepiece and the 4 mm. Objective produces a magnification of **450 diameters.**

In **metallurgical and industrial laboratories,** where opaque specimens are examined, this type of microscope, equipped with No. 12-410 Silverman Illuminator, produces very satisfactory results.

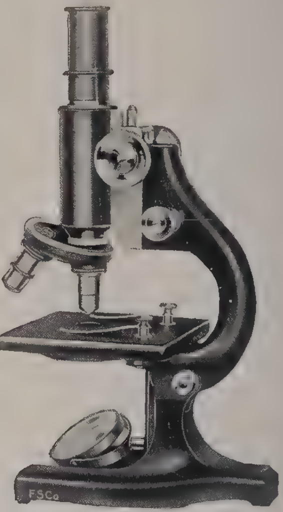
With the exception of the condenser, the construction and finish of the microscope stand with the coarse and fine adjustments, etc., are the same as No. 12-315. The difference between the Type FS 2 and Type FS 4 is that FS 2 is supplied with one (1) 7.5x Huyghenian Eyepiece, and Type FS 4 has two (2) Huyghenian Eyepieces, one each 5x and 10x. Both outfits are equipped with two (2) Achromatic Objectives, one each 16 mm. and 4 mm., and each outfit has a double nosepiece. Each microscope is supplied with a book of instructions and is fitted into a polished hardwood cabinet with brass lock and key.

Equipment designation	FS 2	FS 4
Huyg. Eyepieces	7.5x	5x—10x
Objectives, E.F., mm.	16 —4	16—4
Objective Magnifications	10x—45x	10x—45x
Each	**$71.75**	**74.50**



12-325

SPENCER MICROSCOPES



12-330

12-325. MICROSCOPES, Spencer No. 44, with Condenser. This type of microscope is the standard Spencer instrument for general routine work in biological and pathological laboratories. **For high-power work,** the combination of the 10x Eyepiece and the 1.8 mm. Oil Immersion Objective produces a magnification of **950 diameters.**

The focusing is done by means of a coarse and fine adjustment. The coarse adjustment consists of a diagonally cut rack and pinion. The fine adjustment is simple in construction and very durable. It is of the lever type with a coiled spring designed to take up any difference due to wear. This prevents the development of lost motion in the fine adjustment, even after long and continued use. The fine adjustment ceases to operate when the objective touches the slide. One revolution of the fine adjustment heads raises or lowers the objective 0.2 mm.

The microscope stage is of solid construction and made of a new composition harder and more durable than rubber, which will not warp or fade. It is rectangular in shape and measures 110 mm. x 105 mm. Two spring clips hold microscope slides in place. The condenser has a numerical aperture (N.A.) of 1.20 and is supplied with a blue glass ray-filter. The whole substage is focused by means of a quick-acting screw, with the condenser permanently centered.

The nosepiece revolves and holds all objectives supplied with each outfit. A double nosepiece is supplied with the 44 F equipment, and a triple nosepiece is supplied with the other two equipments. Immersion Oil and Dropping Bottles are supplied with the outfits containing Oil Immersion Objectives. The No. 44 H Microscope is the one most used.

All objectives are achromatic except the fluorite objective (E.F. 2 mm.) supplied with No. 44 J. **For more exacting work,** the fluorite objective produces finer definition than the achromatic series and a freedom from color haze in the field.

The microscope stand is finished in black alcohol-proof enamel, with the pinion and adjustment heads in lacquered brass. The base is connected to the pillar by means of a double-bearing inclination joint with both vertical and horizontal stops. Each microscope is supplied with a book of instructions and is fitted into a polished hardwood cabinet with brass lock and key.

Equipment designation	44 F	44 H	44 J
Huyg. Eyepieces	6x—10x	6x—10x	6x—10x
Objectives, E.F., mm.	16—4	16 — 4 — 1.8	16— 4 — 2
Objective Magnifications	10x—44x	10x—44x—95x	10x—44x—85x
Each	**$88.50**	**120.00**	**133.00**

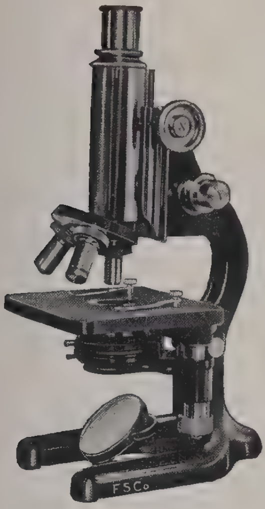
12-330. MICROSCOPES, Spencer No. 44, without Condenser. This is the type of Spencer microscope used in university, high school and other laboratories where **low-power work** is done, and where no oil immersion objective is required. The combination of the 10x Eyepiece and the 4 mm. Objective produces a magnification of **440 diameters.**

In metallurgical and industrial laboratories, where opaque specimens are examined, this type of microscope equipped with No. 12-410 Silverman Illuminator, produces very satisfactory results.

With the exception of the condenser, the construction and finish of the microscope stand with coarse and fine adjustments, etc., is the same as No. 12-325. The difference between the No. 44 B and No. 44 D is that No. 44 B is equipped with one (1) 6x Huyghenian Eyepiece, while No. 44 D is furnished with one (1) 6x and one (1) 10x Eyepiece. Both outfits are equipped with two (2) Achromatic Objectives, one each 16 mm. and 4 mm., and each outfit has a double nosepiece.

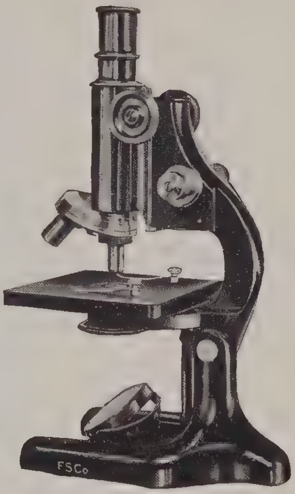
Each microscope is supplied with a book of instructions and fitted into a polished hardwood cabinet with brass lock and key.

Equipment designation	44 B	44 D
Huyg. Eyepieces	6x	6x—10x
Objectives, E.F., mm.	16— 4	16— 4
Objective Magnifications	10x—44x	10x—44x
Each	**$74.75**	**77.50**



12-335

ZEISS
MICROSCOPES



12-340

12-335. MICROSCOPE, Zeiss—Model ASC, with Condenser. This type of microscope is the standard Zeiss instrument for routine work in biological and pathological laboratories. By various combinations of eyepieces and objectives, magnifications from **40 to 900 diameters** can be obtained.

A rack and pinion operates the coarse adjustment. The fine adjustment works through a **train of clock-work gears** which forces a lever to raise the body tube. Downward motion of the tube results from the relaxation of the coil-spring. The left hand head of the fine adjustment is built with a micrometer drum, graduated so that each division represents 0.002 mm. and a complete revolution of the head produces a vertical movement of the tube of 0.1 mm.

The stage is 110 mm. x 110 mm. and is equipped with an Abbe condenser having a numerical aperture (N.A.) of 1.20. An iris diaphragm is built into the condenser and the whole substage is manipulated by a quick-acting screw. A blue glass ray-filter gives the daylight effect.

The microscope is fitted with two Huyghenian eyepieces, 5x and 10x. The triple revolving nosepiece holds the three achromatic objectives whose equivalent foci are 16 mm., 4 mm. and 1.9 mm. ($^{1}/_{12}$-inch). The $^{1}/_{12}$-inch objective is for oil immersion work and is supplied with Immersion Oil and Dropping Bottle. The Zeiss Objectives are now engraved 8, 40 and 90 respectively. By multiplying these magnifications by those of the eyepieces, the total magnification can be easily computed without the use of a magnification table.

The microscope tube and adjustment heads are of polished brass, and the base is finished in black enamel. Each microscope is fitted into a polished hardwood cabinet with brass lock and key.

Model	ASC
Huyg. Eyepieces	5x—10x
Objectives, E.F., mm	16 — 4 — 1.9
Objective Magnifications	8x—40x—90x
Each	**$128.00**

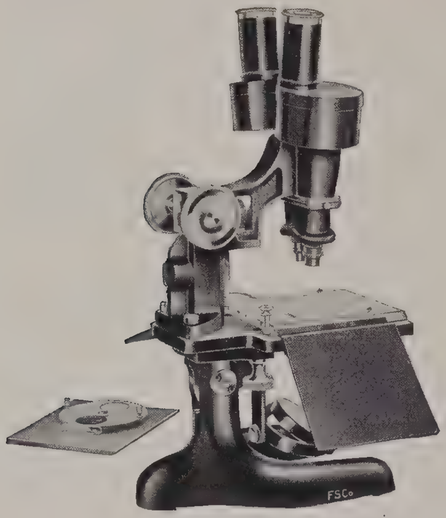
12-340. MICROSCOPE, Zeiss—Model ABC, without Condenser. This is the type of Zeiss microscope used for histology work in high schools and universities, and for any other use which does not require an oil immersion objective. Magnifications from **80 to 400 diameters** can be obtained with this instrument.

The construction of the coarse and fine adjustments is similar to that of No. 12-335. Beneath the stage is a fixed sleeve, into which may be slipped a cylinder diaphragm with three interchangeable stops, which are supplied with the microscope. A double revolving nosepiece holds both achromatic objectives, with equivalent foci of 16 mm. and 4 mm. On Zeiss microscopes these are marked 8 and 40 respectively and when their magnifications are multiplied by that of the 10x Huyghenian eyepiece, the total magnification is computed without the use of a magnification table.

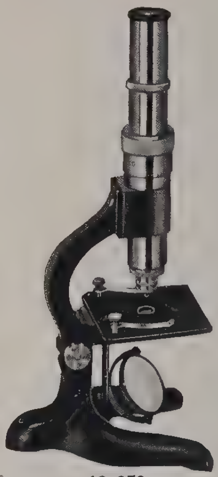
The microscope tube and adjustment heads are of polished brass. The base is finished in black enamel. Each instrument is supplied in a polished hardwood cabinet fitted with lock and key.

Model	ABC
Huyg. Eyepiece	10x
Objectives, E.F., mm	16 — 4
Objective Magnifications	8x—40x
Each	**$80.75**

OTHER TYPES OF ZEISS MICROSCOPES
and Zeiss Microscope Equipment can also be supplied.



12-345



12-350

12-345. MICROSCOPES, Binocular, Bausch & Lomb—Type KA. For low-power work, with magnifications from **10 to 84 diameters,** this type of microscope can be used without eyestrain or fatigue, even after long periods of observation. **The image appears erect and not transposed.** It is necessary to use this instrument to appreciate the advantage of viewing the image in its true proportion, not inverted or reversed as in minocular microscopes. The restful effect upon the eyes is caused by the stereoscopic view, which shows the length, width and depth of the object. This style of microscope is known as the Greenough type.

The stage consists of a metal frame into which slides either of two plates, one of glass 80 x 95 mm. and the other of metal, both of the same size; the stage aperture is 22 mm. diameter. Underneath is a rotating disc which provides white opaque, black opaque, and ground glass stops or clear aperture. By removing the stage plates, the extraordinary range of working distance up to 155 mm. can be obtained. Also, the upper portion of the instrument can be easily detached for examination of large surfaces and no extra base is required. The stage is provided with two removable metal hand rests.

The microscope tubes are fitted with Porro prisms permanently set in position. The eyepieces are paired as well as the objectives. There is a wide adjustment of the eyepieces to accommodate the difference in interpupillary distance in various observers.

The microscope is finished in black alcohol-proof enamel and supplied in a polished hardwood cabinet, fitted with lock and key.

Equipment designation	KA 1	KA 5
Huyg. Eyepieces	10x	5x— 7.5x—10x
Objectives, E.F., mm	40	55— 40 —24
Objective Magnifications	3.8	2— 3.8 —8.4
Each	**$119.00**	**171.00**

12-350. MICROSCOPE, Prep. School Model. This is a low priced but dependable instrument, carefully designed to meet the requirements of school work. It has been used with satisfaction in biology and botany classes and for other work where magnifications up to **145 diameters** are desired. The Prep. School Model weighs about 3 pounds, and can be passed around the class for demonstration purposes.

The focusing by means of the coarse adjustment is accomplished by sliding the microscope tube up or down. The fine adjustment is controlled by operating the knurled collar of the micrometer focusing device.

With each microscope is supplied one 2x Huyghenian eyepiece and a triple, divisible objective. The objective screws apart and magnifications of 50, 100 and 145 diameters can be obtained by using one, two or three of the lenses respectively. (*With a 5x Eyepiece, No. 12-355, magnifications up to 200 diameters can be secured with this same objective.*)

The stage measures 70 mm. x 70 mm. and is equipped with spring clips for holding microscope slides. The mirror is movable and inclinable to 90 degrees. The base is heavy and attached to the pillar by means of a joint which has both vertical and horizontal stops. The microscope tube is of polished brass and the base is finished in black enamel.

Supplied with one (1) 2x Eyepiece, in wooden case. **Each, $25.00**

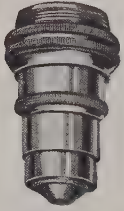
OTHER TYPES OF MICROSCOPES

With or without stands, including different arrangements of eyepieces and objectives, can also be supplied.

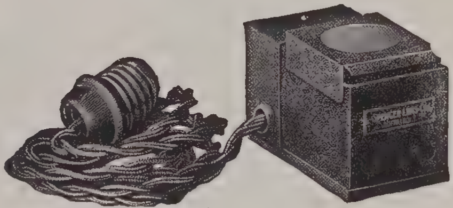
MICROSCOPE ACCESSORIES

12-355

12-360



12-365



12-370

12-355. MICROSCOPE EYEPIECES, B. & L., Huyghenian. The eyepieces of this series are marked according to their magnification when used as magnifiers. The whole series is parfocal, so that in interchanging them only a very slight change in the fine adjustment is necessary. These eyepieces are the standard size, and measure 23 mm. outside diameter.

Magnification	5x	6.4x	7.5x	10x	12.5x
Equiv. Foc. Length (E.F.) approx. mm	50	40	33	25	20
Each	**$2.75**	**2.75**	**2.75**	**2.75**	**2.75**

12-360. MICROSCOPE OBJECTIVES, B. & L., Achromatic. All of these are "dry" objectives—not used with immersion oil. They are corrected for a cover glass thickness of 0.18 mm., which is the average thickness of a No. 2 cover glass. For critical work, measured cover glasses should be used because a variation of 0.03 mm. in the thickness of the cover glass may destroy the spherical correction of the objective and, with it, the definition of the object.

Besides the Equivalent Focal Length (E.F.) in millimeters, these objectives are also marked with their magnification number which, when multiplied by the magnification number of the eyepiece, gives the total magnification without the use of a magnification table.

The 4 mm. objective can be supplied in two types. The 4L with the longer working distance is most used. The 4S has greater resolving power.

Equiv. Foc. Length (E.F.) mm.	48	32	16	8	4L	4S
Magnification number	2	4	10	21	43	45
Working distance, mm.	53	38	7	1.6	0.6	0.3
Numerical aperture (N.A.)	0.08	0.10	0.25	0.50	0.65	0.58
Each	**$5.00**	**6.50**	**8.00**	**13.50**	**15.00**	**15.00**

12-365. MICROSCOPE OBJECTIVES, High Power, B. & L., Oil Immersion. These objectives are used with microscope immersion oil and for this reason the thickness of the cover glass does not matter. However, the microscope tube length of 160 mm. is an important factor, and must be strictly adhered to.

The fluorite objective has a closer correction than those of the achromatic series. The correction for the color haze, both for chromatic and spherical aberration, in the fluorite system lies about halfway between the achromatic and apochromatic, and therefore provides an extra fine objective, at a medium cost, which fulfills most of the needs in exacting work.

By multiplying the magnification number of the objective by that of the eyepiece used, the total magnification can be computed without the use of a magnification table.

System	Achromatic	Fluorite
Equiv. Foc. Length (E.F.) mm	1.9	1.8
Magnification number	97	100
Working distance, mm	0.15	0.13
Numerical aperture (N.A.)	1.25	1.30
Each	**$35.00**	**48.00**

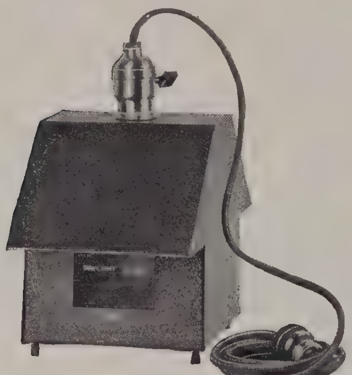
12-370. MICROSCOPE ILLUMINATOR, Substage, Electric, with Daylight Glass. The advantage of this popular Spencer microscope illuminator is that it can be placed under the stage of the microscope by swinging the mirror to one side. It can also be set on end and the light directed into the mirror in the usual way.

Another feature of this illuminator is that it is fitted with a special Corning Daylight Glass, which produces a light equal to that received from a white cloud and by means of which the true colors of stains and specimens are seen.

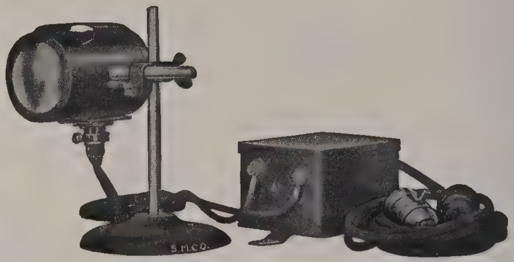
The outfit is small and compact. One end and the bottom is made of wood to avoid scratching surfaces of desks or tables on which it is placed. The covering is of sheet metal finished in dull black to prevent reflections and designed so that the light escapes only through the glass window. The lamp has a concentrated filament and is gas-filled, which, together with the deep reflecting mirror, produces a light sufficiently intense to be used with high-powered objectives. The illuminator can be used either with or without the substage condenser.

Supplied complete with cord and plug for use without rheostat in connection with the usual 110-volt current, A.C. or D.C. Supplied with Daylight glass. **Each, $6.50**

12-375. ELECTRIC LAMP, for No. 12-370 Illuminator; 15-watt, gas-filled, for 110 volts.......... **Each, $1.25**



12-380



12-390

12-380. MICROSCOPE ILLUMINATORS, B. & L.—Chalet Model, Electric. This is a new illuminator designed by Prof. S. H. Gage of Cornell University for use with one, two or four microscopes at the same time.

The powerful 100-watt, gas-filled electric lamp, with Corning Daylight Windows, produces a white light equal to that received from a white cloud and shows the bacteriological stains and specimens in their true colors. The ventilation is arranged to allow sufficient light for making notes. but no direct light reaches the eyes of the workers. The housing has no bottom and may be placed over dishes and used for heating paraffin, etc.

Supplied complete with cord and plug ready to be attached to any 110-volt circuit, A.C. or D.C.

Number of Daylight Windows	1	2	4
Each	**$13.00**	**16.00**	**22.00**

12-385. ELECTRIC LAMP, for No. 12-380 Illuminators; 100-watt, gas-filled, for 110 volts........**Each, $1.75**

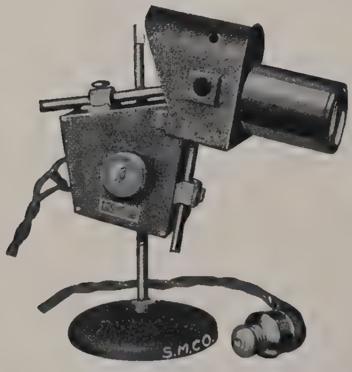
12-390. MICROSCOPE ILLUMINATOR, B. & L., Electric, with Condensing Lens. This illuminator can be used for all work with the microscope, including micro-photography with medium-power objectives. It works well for dark-field illumination, and for drawing with the Camera Lucida.

The lamp is 6-volt, 24-watt, gas-filled with highly concentrated filament, so that the light closely approaches the ideal point-source, thereby giving greater efficiency. The lamp socket is mounted on a rod support and is adjustable both vertically and horizontally.

Supplied with the regular spherical condensing lens, complete with cord and plug. For alternating current, a transformer is supplied to reduce the voltage. On direct current, a rheostat is supplied.

For 110 volts, current..**Each, $24.50**

12-395. ELECTRIC LAMP, for No. 12-390 Illuminator; 24-watt, 6-volt, gas-filled................**Each, $1.50**



12-400

12-400. MICROSCOPE ILLUMINATOR, Arc Lamp, Spencer. The arc lamp gives a more intense light than any other type of illuminator and, because of this, is specially adapted for use where a very strong light is desired.

This illuminator is equipped with the Corning Daylight Glass which shows bacteriological stains and specimens in their true colors. The light is equal to that received from a white cloud. The carbons are held at an angle of 70° to each other, which has been found to be the most satisfactory angle for alternating current, and also suitable for direct current. The condenser is the bullseye type and is focusable.

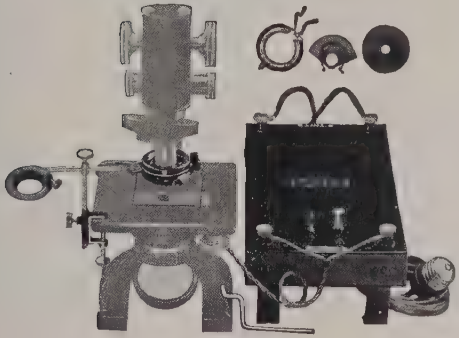
The lamp housing is mounted upon a rod support and can be adjusted both vertically and horizontally. The protecting hood has smoked glass windows through which the position of the carbons may be observed when the arc is burning.

A fixed rheostat for 110-volts, 5-amperes is supplied so that the outfit is complete, ready to be attached to the usual 110-volt current, A.C. or D.C. Supplied with Daylight glass. **Each, $39.75**

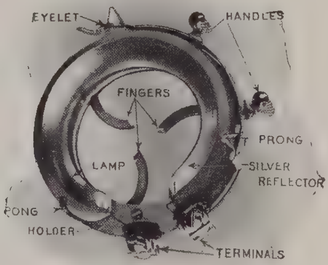
12-405. CARBONS, Cored, for No. 12-400 Illuminator. Length, 150 mm ; outside diameter, 8 mm. **Per dozen, $ .90**

SILVERMAN ILLUMINATOR

12-420



12-410



An enlarged view of the Silverman Illuminator as seen from below

12-410. MICROSCOPE ILLUMINATOR, Silverman, Electric, for Opaque Objects. This apparatus was designed by Dr. Alexander Silverman, of the University of Pittsburgh, and has proven to be an efficient instrument for the illumination of opaque objects under the microscope and for micro-photography.

The Silverman illuminator provides for oblique illumination. Those portions of the field, which are dark by vertical illumination, are light colored under the Silverman illuminator and vice versa. Light absorbing substances such as papers, textiles, insulating materials, botanical specimens, ceramic materials, etc. can be observed in great detail. The Silverman illuminator can also be lowered into hollow objects and used where other types of illuminators are impracticable.

For further discussion, see Alexander Silverman, "A New Method of Microscope Illumination," *Metallurgical and Chemical Engineering, March 15, 1918;* "A New Illuminator for Microscopes," *The Journal of Industrial and Engineering Chemistry, December, 1918;* "A New Microscope Illuminator," *Transactions of the Faraday Society, Vol. XVI, 1920,* and "A New Departure in Photomicrography," *Journal of the Society of Chemical Industry, Vol. XXXVIII, pp. 126, 127, May 31, 1919.*

The essential part of the apparatus is a specially prepared electric lamp containing a single tungsten filament. The glass is blue and the light approximates the color of daylight. The lamp is in the shape of a circle with an outside diameter of 35 mm. It is silvered a little more than halfway around. The lamp is held in a holder, which has three iris-like fingers actuated by springs by means of which the lamp can be clamped to any type of objective or to a special support which can be fastened to the microscope stage. A disc and a shutter are provided to cut off part of the light of the lamp, if desired.

The special rheostat is equipped with a push switch which provides for two intensities of illumination. For visual work, including that with an oil immersion objective, a current of 0.9 amperes at 13 volts passes through the filament. For photographic work, a current of 1.2 amperes at 18 volts gives an intense light. The life of the electric lamp at the low voltage is about 150 hours and of the high voltage about 3½ hours. By means of this arrangement the object may be focused and prepared at the low voltage and the high voltage used after the camera is ready and then only from 10 to 40 seconds. The 110-volt rheostat operates on currents from 104 to 124 volts. The 220-volt rheostat operates on currents from 208 to 248 volts.

Supplied complete, with accessories as illustrated, including two Daylight lamps, rheostat, cord, and plug.

For current, volts	110	220
Each	**$46.00**	**47.00**

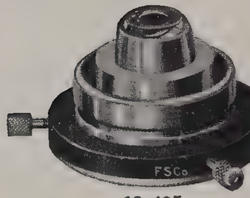
12-415. ELECTRIC LAMPS, Daylight Glass, for No. 12-410 Illuminator. Used either on 110 or 220-volt apparatus. **Each, $4.50**

12-420. MICROSCOPE ILLUMINATORS, Vertical, B. & L., for opaque objects. This style of illuminator was originally designed for use with metallurgical specimens, but is also well adapted for use with all kinds of opaque or semi-opaque substances.

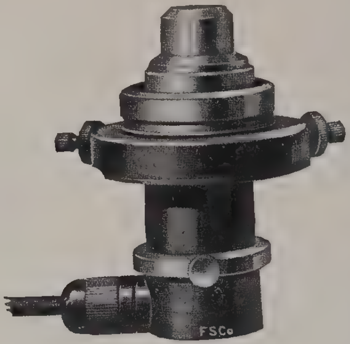
The housing is attached between the objective and the microscope tube. A locking device prevents rotation of the illuminator after it is once set. The light from an outside source enters through an aperture and is reflected down through the objective to the specimen under examination. A knurled head, mounted in a centering device, regulates the reflector.

Type No. 1789 Illuminator has a circular, plain glass reflector and is the kind regularly supplied with Metallurgical Microscope No. 12-490. Type No. 1759 Illuminator has a semi-circular mirror reflector, which provides for oblique illumination.

Type No.	1789	1759
Reflector	Full circle	Semi-circle
Each	**$15.00**	**15.00**



12-425



12-430

12-425. MICROSCOPE DARK-FIELD ILLUMINATOR, Substage Type. This illuminator is used for the detection of minute colloidal particles held in suspension in fluids or for examining unstained and living bacteria and other microorganisms.

The illuminator is interchangeable with the Abbe condenser, and makes possible the examination of very small objects invisible with ordinary means of illumination. By means of the dark-field illuminator, these small particles are seen as brilliantly lighted bodies in a dark field.

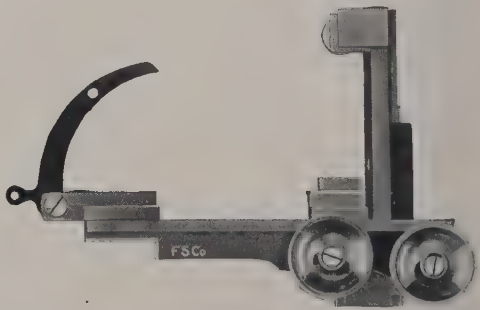
This substage type has the advantage of centering screws, and can be accurately adjusted. The illuminator is supplied with objective funnel stop. (*When ordering, state name of manufacturer of the objective with which the illuminator is to be used.*)

Supplied in special case. **Each, $22.00**

12-430. MICROSCOPE DARK-FIELD ILLUMINATOR, with Electric Light, Spencer. This is a substage illuminator similar to No. 12-425, but has an added condensing lens and a built-in, low-voltage electric lamp, which is adjustable by centering screws. This design was made to meet the requirements of the U. S. Army Medical School and Hospitals.

Supplied in special case with objective funnel stop and a 4-volt electric lamp, which can be operated satisfactorily by a suitable dry battery. **Each,** without battery, **$35.00**

12-435



12-440

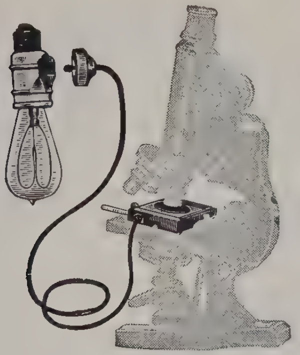
12-435. MICROSCOPE MECHANICAL STAGE, with Graduated Scales. This mechanical stage can be attached to the sides of rectangular microscope stages. It provides for methodical examination, and is considered necessary in manipulating the slide under an oil immersion lens or in blood counting. Any portion of the slide can be quickly and conveniently relocated.

The spring arm is adjustable and holds any sized slide up to 95 mm. long. It is movable in both directions by means of carefully adjusted racks and pinions. The right to left scale reads 75 mm., and the forward and backward scale reads 45 mm. Both scales are graduated in single millimeters with verniers reading to $^1/_{10}$ mm. By means of these scales, all slides can be charted.

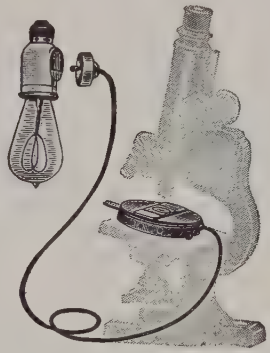
Supplied in leatherette covered case. (*When ordering, state manufacturer's name of microscope with which the mechanical stage is to be used.*) **Each, $30.00**

12-440. MICROSCOPE MECHANICAL STAGE, without Graduated Scales. This mechanical stage meets the requirements of a large class of pathologists and bacteriologists, who desire a routine examination, but who do not care to record exact positions for future reference. It has all the features of No. 12-435, except the millimeter scales, verniers and adjustable slide holder. This stage holds slides 75 mm. long.

Supplied in leatherette covered case. (*When ordering, state manufacturer's name of microscope with which the mechanical stage is to be used.*) **Each, $25.00**



12-445



12-450

12-445. MICROSCOPE STAGE INCUBATOR, Electric, for 110 volts; can be used on either alternating or direct current. This miniature incubator fits the mechanical stage of any standard microscope and can be accurately regulated at any point within a range of temperature from 80° F. to 110° F. (27° C. to 43° C.). It is used in the Widal test for typhoid; for the observation of plant microorganisms such as bacteria and yeasts in a hanging drop or a hanging agar block; also for the observation of microscopic animal organisms such as malarial parasites, trypanosomes and amoeba; and for the cultivation of spirochetes and tumor cells by the methods of Harrison and Noguchi. The temperature of the chamber can be quickly changed by a turn of a regulating screw, thus the effects of different temperatures may be quickly observed.

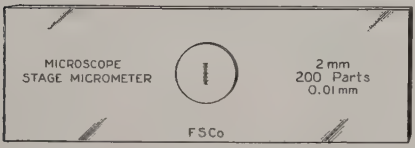
The incubating chamber measures 90 x 50 mm., and is 15 mm. deep with receptacles to take a 75 x 25 mm. microscope slide, which forms the floor of the chamber and rests directly on the condenser of the microscope, so that an immersion lens may be used. A sheet of clear mica, with a hole the size of the microscopic objective, forms the cover; a delicate thermo-regulator is so devised that a constant temperature may be maintained indefinitely over the surface of the slide.

Supplied complete in every detail with two microscope slides, double lamp socket, 16 c.p. carbon filament lamp, heating element, thermometer and adjustable electro-thermostat which can be set to automatically maintain any temperature between 80° and 110° F. The pilot lamp acts as a resistance, and indicates whether the current is on or off. **Each, $20.00**

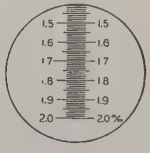
12-450. MICROSCOPE WARM STAGE, Electric, for 110 volts; can be operated on either alternating or direct current. With this warm stage, microorganisms, requiring blood-heat temperature (90° F. or 37½° C.) for maintaining their mobility, can readily be discovered and examined.

The warm stage can be attached without adjustment to any microscope stand. The shape is circular and measures 90 mm. diameter and 18 mm. deep. The center has an 18 mm. hole, over which the usual 75 x 25 mm. microscope slide is placed.

Supplied complete with two microscope slides, double lamp-socket, 16 c.p. carbon filament lamp, heating element, thermometer and adjustable electro-thermostat, which automatically maintains a constant temperature of 98° F. or 37½° C. The pilot lamp acts as a resistance, and also indicates whether the current is on or off. **Each, $16.00**



12-455



A portion of the scale as viewed through the microscope

12-460

12-455. MICROSCOPE STAGE MICROMETER, Spencer; for measuring the diameter of a microscopic field. The scale is engraved on a glass slide 75 x 25 mm. and measures 2 mm. divided into 200 parts (to 0.01 mm.). **Each, $7.00**

12-460. MICROSCOPE MICROMETER EYEPIECE, with fixed scale, Spencer. This instrument consists of a standard 10x Eyepiece having the eye lens made focusable by spiral action. The micrometer disc is fixed to the diaphragm of the eyepiece and can be brought to a sharp focus for any eye. The scale is 5 mm. long, divided into 50 parts (0.1 mm.). **Each, $7.25**

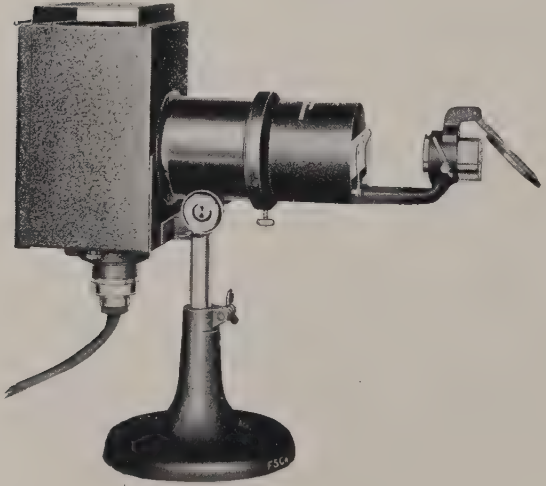
12-465

12-470

12-465. MICROSCOPE DEMONSTRATION EYEPIECE, B. & L. With this device, which can be attached to any style of compound microscope, two persons can view the same microscopic field at the same time. This has proven of great value where instructors wish to conduct quizzes, etc. The pupil looks through the microscope as usual and the instructor looks through the horizontal eyepiece which can be focused independently. A pointer, operated by a small handle just below the eyepiece, can be used by one person to call the attention of the other to any particular part of the field. Supplied complete with 6.4x Eyepieces. **Each, $40.00**

12-470. MICROSCOPE CAMERA LUCIDA, Spencer No. 505. With this apparatus the entire microscopic field can be projected and drawn upon a piece of paper beside the microscope; it can be regulated so that both the object under examination and the drawing pencil are well illuminated.

The entire prism box is hinged so that it can be swung on a horizontal axis and is thus easily thrown out of position for changing eyepieces or for careful examination of the object without the interposition of the prism. The mirror is 70 x 105 mm., and is supported on an adjustable bar graduated to indicate the distance of the mirror from the microscope. Graduations are also provided to indicate the angle of the mirror. Supplied in special case. **Each, $20.00**



12-475

MICRO-PROJECTOR

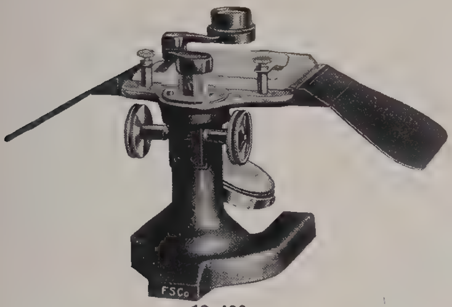
B. & L.

For Drawing or
Direct Projection

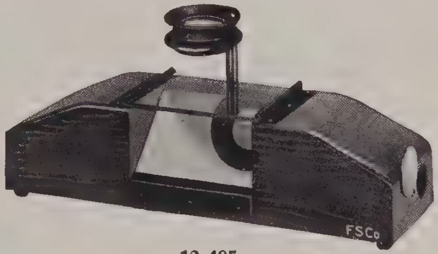
12-475. MICRO PROJECTOR AND DRAWING APPARATUS, B. & L. The low-power projection microscope is fitted with a hinged reflecting mirror so that the image may be projected downward on a drawing board or on a vertical screen.

The microscope is equipped with a fixed substage condenser and one projection lens of 2½-inch focus covering a field ⅞-inch diameter. The adjustment permits a minimum magnification of 7 diameters at a minimum projection distance of 18 inches. The microscope illuminator has a spherical condenser in whose mounting the microscope is attached. This mounting is provided with a rack and pinion adjustment. The source of light is a 6-volt, 108-watt, ribbon-filament, electric lamp which is an ideal source of illumination for all kinds of microscopy.

Supplied complete with transformer for alternating current, (A.C.) 110 volts, 60 cycles (the usual house current). **Each, $65.00**



12-480



12-485

12-480. MICROSCOPES, Dissecting, Spencer No. 82. This is a well made dissecting microscope, thoroughly serviceable and convenient for instructors and students in the higher classes.

The focusing is accomplished by diagonal rack and pinion. Two milled pinion heads allow the use of either hand in focusing. The stage, 75 x 100 mm., is a heavy polished glass plate. A black and white background is provided, which slips into place beneath the glass plate. Metal hand rests, which are included, may be easily attached.

The jointed lens arm is very substantial and so mounted that the lens may be used over any part of the stage. The standard 50 mm. mirror, plane and concave, is substantially fastened to a swinging mirror bar. The base and pillar are one solid casting of metal. The black finish is serviceable and durable.

This type of microscope is furnished with either of the following combination of doublet lenses, and supplied in a hardwood cabinet.

No.	82A	82B
Magnifications	9x	6x —12x
Equiv. Foc. mm	27.8	41.6—20.8
Working Distance, mm	15	22 —12
Each	**$26.75**	**28.50**

12-485. MICROSCOPE, Barnes Dissecting, Bausch & Lomb. This is the new model which has proven very popular for elementary work in botany, zoology, etc. It is made from a solid block of hardwood, 70 x 250 mm., neatly finished. The sides are beveled to form hand rests. A hole is bored partly through the block, to be used as a receptacle for dissecting instruments.

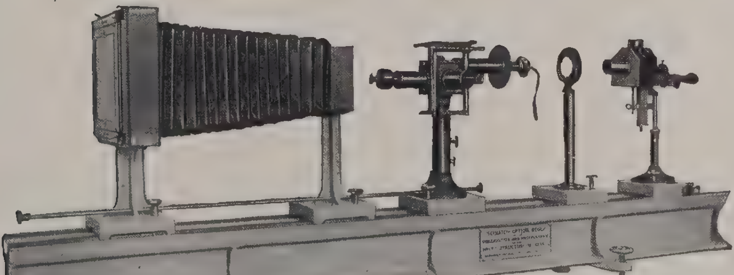
The magnifying lens is accurately constructed and intended for use in biological work and in dissections. It gives a large, clear field. The magnification is 7.5x, which is sufficient for elementary purposes. The lens arm swings freely over the stage. The focusing is done by a coarse and fine adjustment. The coarse adjustment is accomplished by moving the post of the revolving lens arm up or down in a friction tube, and the fine adjustment is made by screwing the microscope lens in the threaded support arm.

The stage is of clear glass, 65 x 85 mm., and is illuminated by a plane mirror mounted at the proper angle.

Each, $3.00

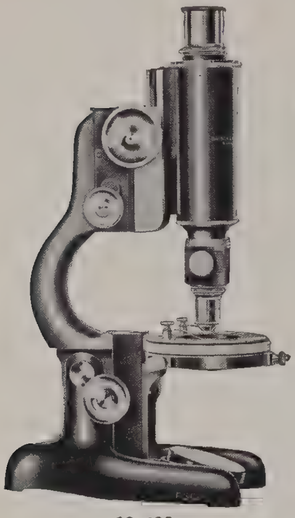
MICROSCOPE, Tripod Magnifier, see No. 12-055.

SCIMATCO OPTICAL BENCH



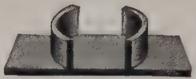
12-220

12-220. MICROSCOPE, Metallurgical; complete equipment for Metallography, see No. 12-220 Scimatco Optical Bench, described on pages 436 and 437.

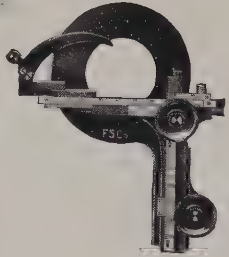


12-490

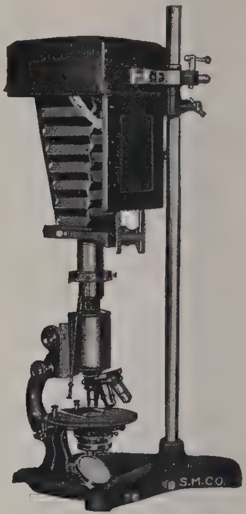
12-500



12-505



12-495



12-510

12-490. **MICROSCOPES, Metallurgical, Bausch & Lomb—Type FSM,** designed by Dr. Albert Sauveur of Harvard University. This microscope is for use in metallography and for any other microscope **work with opaque objects** requiring a vertical illuminator and focusing stage.

The circular revolving **stage is focusable** by means of a rack and pinion. This increases the working distance and adjusts the focus of the objective upon the object without interfering with the vertical illuminator and the source of light. The stage is 78 mm. diameter with a 40 mm. aperture. It is provided with centering screws and has a vulcanite top. The stage is removable for substitution of Mechanical Stage No. 12-495, if desired. The vertical illuminator consists of a plane glass reflector; full circle, with means of tilting and centering. The illuminator is placed above the objective and directs the light, coming through an aperture in the side, down through the objective to the object under examination. The general focusing both for coarse and fine adjustment is done by side adjustment heads.

The **objectives** are in **short mounts** and the 4 mm. objective is specially corrected for uncovered objects. The microscopes are finished throughout in alcohol-proof lacquer and supplied with **revolving stage** in a hardwood cabinet fitted with lock and key.

Equipment designation	FSM 1	FSM 3	FSM 5
Huyg. Eyepieces	5x	5x—10x	5x—10x
Objectives, E.F., mm.	16 — 4	16 — 4	32 —16 — 4
Objective Magnifications	10x—45x	10x—45x	4x—10x—45x
Each	**$154.00**	**156.75**	**163.25**

ILLUMINATORS for use with No. 12-490, see No. 12-410, also No. 12-400. **Camera,** see No. 12-510.

12-495. **MICROSCOPE MECHANICAL STAGE, for No. 12-490 Metallurgical Microscope.** The adjustments are by rack and pinion giving equal speed in two directions at right angles to each other. The pinion heads are close together in constant relative position to each other. The scales are graduated in millimeters and supplied with verniers for exact recording and relocation of a desired field. The mechanical stage is mounted on a circular stage plate which is interchangeable with the plain revolving stage regularly supplied with the No. 12-490. This mechanical stage can be used only on No. 12-490 Metallurgical Microscope. For other mechanical stages, see No. 12-435 and No. 12-440. **Each, $42.50**

12-500. **METALLURGICAL SPECIMEN HOLDER, Sauveur.** The metallographic specimen is supported in the holder by a rubber band so that the prepared surface is always at right angles to the objective, and only one side of the specimen need be prepared. A cover glass can be inserted in the holder, if the objective used is corrected for this. **Each, $3.00**

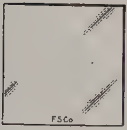
12-505. **METALLURGICAL SPECIMEN MOUNTER, for Glass Slides.** This is a simple device which does not require that the metallurgical samples be prepared with two parallel sides. The specimen with one prepared side is placed face downward. Over the specimen is spread placticene and the glass slide pressed against this. When set, the specimen can be placed on the microscope stage and the prepared surface is at right angles to the objective. Any number of specimens prepared on this mounter are the same height, and this enables change of specimens without change of focus in the microscope. **Each $1.75**

12-510. **MICROSCOPE CAMERA, Photographic, Spencer.** This photomicrographic camera was designed by Dr. L. B. Wilson. It can be used over a wide range of application in various laboratories. It is suitable for photographing with the low or medium powers of the microscope and for copying or for general photography of insects, leaves, fruits, etc. The camera is mounted on a rod support and is adjustable vertically and horizontally. There are suitable stops for recording position, so that the camera can be returned to its original position over the microscope, if it is swung aside for any purpose.

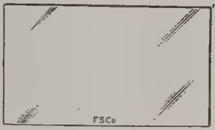
It is equipped with a rapid rectilinear lens and automatic shutter, with adapters to connect the camera with the microscope tube for photomicrography. The camera takes a photograph measuring 3¼x4¼ inches, and is supplied with one double plate holder, but **without microscope.** **Each, $83.00**

12-515. **PLATE HOLDER, Double, for No. 12-510 Camera;** for plates 3¼ x 4¼ inches. **Each, $2.00**

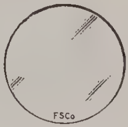
MICRO COVER GLASSES AND SLIDES



12-520
See also No. 12-525



12-530



12-535
See also No. 12-540

12-520. MICRO COVER GLASSES, Square, No. 2. Made of thin colorless glass and used to cover specimens on microscopic slides. The cover glasses are neatly packed in ½-ounce boxes. These No. 2 covers are from 0.17 to 0.25 mm. thick. The No. 2 cover glass is the most popular and is the thickness most used.

Size, mm	18	22	25
Per ounce (No. 2)	**$1.40**	**1.40**	**1.40**

25 ounce lots, 10% discount. **100 ounce lots,** 20% discount

12-525. MICRO COVER GLASSES, Square, No. 1. Same as No. 12-520 but thinner. The thickness of these glasses is from 0.13 to 0.17 mm.

Size, mm	18	22	25
Per ounce (No. 1)	**$1.60**	**1.60**	**1.60**

25 ounce lots, 10% discount. **100 ounce lots,** 20% discount

12-530. MICRO COVER GLASSES, Rectangular, No. 2. Made of thin colorless glass and used to cover **large specimens** on microscopic slides. The cover glasses are neatly packed in ½-ounce boxes. No. 2 thickness is from 0.17 to 0.25 mm. and is the thickness most used.

Size, mm	40x22	50x22	50x35	50x43
For micro slides	75x25	75x25	75x38	75x50
Approx. number per oz	76	52	40	30
Per ounce	**$1.40**	**1.40**	**1.40**	**1.40**

25 ounce lots, 10% discount

12-535. MICRO COVER GLASSES, Round, No. 2. Made of thin colorless glass and used to cover specimens on microscopic slides. The cover glasses are neatly packed in ½-ounce boxes. No. 2 thickness is from 0.17 to 0.25 mm., and is the thickness most used.

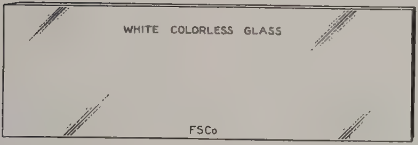
Size, diameter, mm	18	22	25
Per ounce	**$1.70**	**1.70**	**1.70**

25 ounce lots, 10% discount. **100 ounce lots,** 20% discount

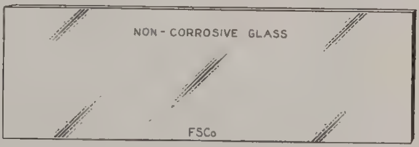
12-540. MICRO COVER GLASSES, Round, No. 1. Same as No. 12-535 but thinner. The thickness of these glasses is from 0.13 to 0.17 mm.

Size, diameter, mm	18	22	25
Per ounce	**$2.00**	**2.00**	**2.00**

25 ounce lots, 10% discount. **100 ounce lots,** 20% discount



12-545



12-550

12-545. MICRO SLIDES, White Colorless Glass. These slides are colorless, even when viewed edgewise. They have the advantage of presenting stained, bacteriological specimens in their true colors. These are the standard size slides 75 x 25 mm. and have finely ground edges. The thickness averages between 1.00 mm and 1.25 mm., which is the medium one used for general microscope work. The slides are put up neatly in boxes of 72 each.

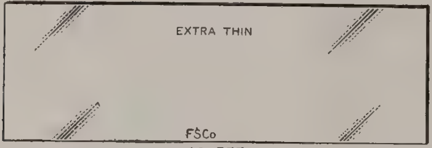
Per gross, $2.00
50 gross lots, 10% discount

12-550. MICRO SLIDES, Non-Corrosive, Greenish Tint. These slides are greenish when viewed on edge, but are practically colorless under the microscope. They have the advantage of being less corrosive and do not fog. The edges are finely ground. The thickness averages between 1.00 and 1.25 mm., which is the medium one used for general microscope work. The slides are put up neatly in boxes of 72 each. The 75 x 25 mm. size is the standard size; the two larger sizes are used only where large slides are required.

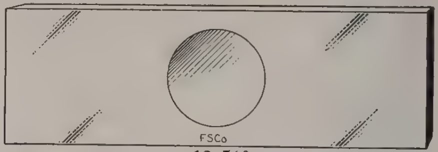
Size, mm	75x25	75x38	75x50
Per gross	**$1.60**	**2.25**	**3.00**

50 gross lots, 10% discount

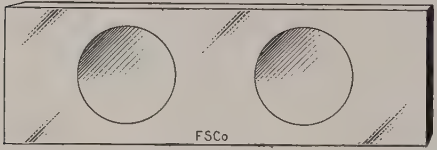
Micro Slides and Slide Boxes



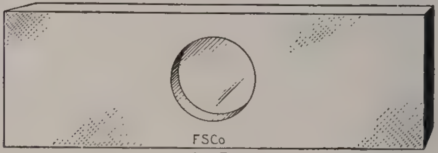
12-555



12-560



12-565



12-570

12-555. MICRO SLIDES, Extra Thin, Colorless Glass. These slides average about 0.75 mm. thick, and are used for high-power **work with oil immersion objectives.** The slides are clear and colorless and the edges are finely ground. The size is the standard 75 x 25 mm. and the slides are put up neatly in boxes of 72 each.

Per gross, $2.25
50 gross lots, 10% discount

12-560. MICRO SLIDES, Hanging Drop, Medium Thickness. These are used to examine living microorganisms, such as bacteria and yeasts in hanging drops. The slides are made somewhat heavier than the usual micro slide, and average between 1.25 mm. and 1.50 mm. thick. The concavities are ground and polished, and are 18 mm. diameter and 0.8 mm. deep. The slides are 75 x 25 mm. and put up in ½-gross boxes.

Number of concavities	1	2
Per dozen	**$1.20**	**1.80**
Per box (½-gross)	**$6.00**	**8.50**

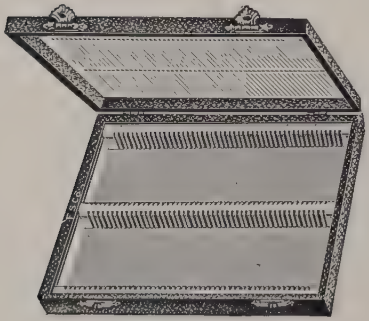
12-565. MICRO SLIDES, Hanging Drop, Heavy Glass. These are similar to No. 12-560 except that the glass is very thick and the concavities 1.75 mm. deep. They are used for larger specimens. The slides measure 75 x 25 mm.

Number of concavities	1	2
Each	**$ .20**	**.30**

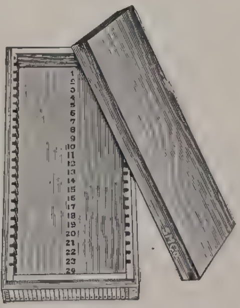
Dozen lots, 10% discount

12-570. MICRO SLIDE, Culture, Plate Glass, with Well. This slide is used for living specimens in very large hanging drops or in agar blocks. The slide measures 75 x 25 mm. and is made of polished plate glass 5 mm. thick, with ground and polished edges. The bottom of the slide is polished and the top has a matte surface. The well is 16 mm. diameter and 3 mm. deep, with straight sides and flat bottom. **Each, $ .40**

MICRO FOSSIL SLIDE, for examining fossils obtained at various horizons in logging oil wells, see No. 13-556, page 492.



3-445



3-450

3-455

3-445. MICRO SLIDE BOX, for 100 Slides; with wooden frame, heavy pasteboard top and bottom, hinged cover and two metal snap-clasps. The inside is carefully made, each numbered partition corresponds to a number in the Index on the inside of the cover, where a record may be kept of each individual slide. This box is made for standard slides, 75 x 25 mm. **Each, $1.00**

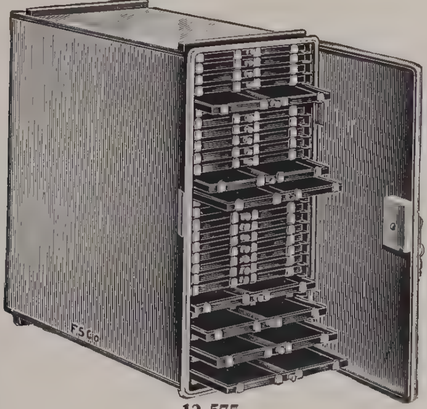
Per dozen, 10% discount. **Per gross,** 20% discount

3-450. MICRO SLIDE BOX, for 25 Slides, of wood, sanded finish; the detachable cover fits over a shoulder on the top of the box. Each partition is numbered, corresponding to the Index on the outside end of the box. Made for standard slides, 75 x 25 mm. **Each, $ .15**

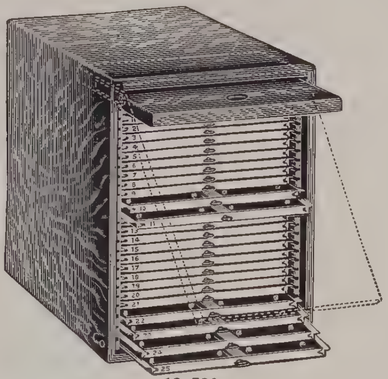
Per dozen, 10% discount. **Per gross,** 20% discount

3-455. MICRO SLIDE BOX, Folding Form, for 20 Slides, of very heavy pasteboard, with two folding covers, each held closed by two metal clasps; arranged so the slides will lie horizontally. Each partition is numbered, corresponding to a number in the Index on the outside front covers. Made for standard slides, 75 x 25 mm. **Each, $ .50**

Per dozen, 10% discount. **Per gross,** 20% discount



12-575



12-580

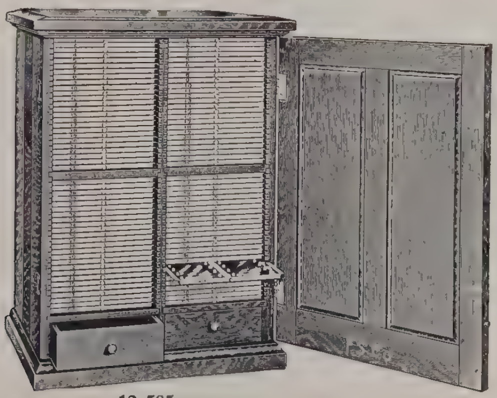
12-575. MICRO SLIDE CABINET, All Metal, Capacity 720 Slides. This cabinet is a piece of standard apparatus made for use in hospital and other laboratories. It contains 30 trays holding 24 slides each 75 x 25 mm. Provision is made so that a number of units can be stacked one upon the other. Metal cabinets are fire-proof.

The trays are of the new form with ridges which keep the slides from overlapping. A depression under each row of slides facilitates handling them. Each tray is japanned black and fitted with card-holder and knob. The cabinet is very compact and measures 14½ inches high, 13 inches wide and 7 inches deep. It is furnished with brass lock and key. **Each, $38.00**

12-580. MICRO SLIDE CABINET, Oak Case, Capacity 500 Slides. The disappearing door is a feature of this cabinet and makes it a unit which can be conveniently combined with a number of the same kind in building up a system by placing one cabinet upon the other or side by side.

There are 25 numbered trays of aluminum, each holding 20 slides 75 x 25 mm., with each slide in a separate compartment. By placing a rubber band around the ends of another lot of micro slides, two can be placed one above the other in the same compartment, so that by this means 1000 micro slides can be accommodated in this cabinet.

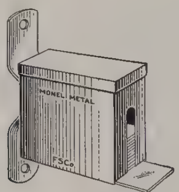
The case is made of quartered oak, well finished, and measures 8½ x 12 x 10 inches high. **Each, $27.50**



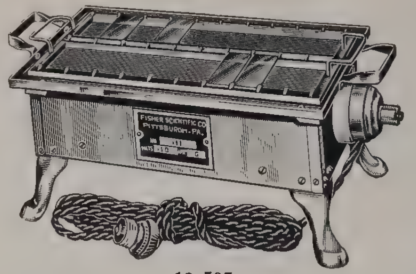
12-585 **Capacity 2000 Slides**

12-585. MICRO SLIDE CABINETS, Oak Case, Aluminum Trays. The cases are quartered oak and grooved so that each tray fits its own slot. The trays are aluminum, each holding 20 slides 75 x 25 mm. lying flat. Each tray is numbered and fitted with a finger-pull. The drawers in the bottom can be used for microscope accessories or for a card index. Spring snaps keep the doors closed.

Capacity, slides	1000	2000	3000
Width, inches	9	16½	24
Depth, inches	13½	13½	13½
Height, inches	22¼	22¼	22¼
Each	**$55.00**	**110.00**	**150.00**



12-590



12-595

12-590. MICRO SLIDE HOLDER, Monel Metal. This holder is made to be attached to the wall and used for holding clean microscopic slides 75 x 25 mm. The slot arrangement provides for withdrawing the slides one at a time and for observing the quantity of slides in the holder. The Monel metal will not rust or contaminate the slides. Capacity about 50 slides 75x25 mm. **Each, $3.00**

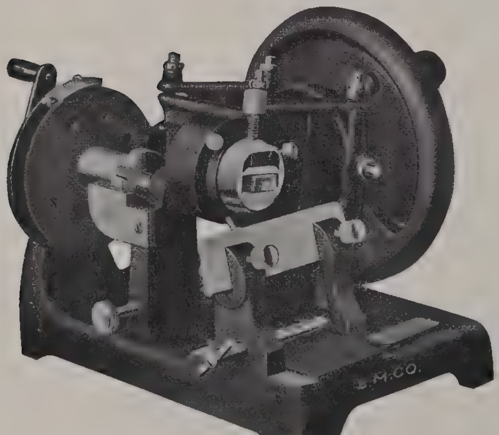
Dozen lots, 10% discount

12-595. MICRO SLIDE STAINING AND DRYING BATH, Electric, for 110 volts; can be used on either A.C. or D.C. This apparatus is made entirely of aluminum, transite lined. It is a time-saver for quick and accurate work in any sized laboratory. Twenty slides can be accommodated at one time.

The heating element is controlled by a 3-heat switch. High heat is used for carbolfuchsin staining in T.B. work and either medium or low heat for drying. The aluminum plate prevents stains dropping on the heating element. The slide rack is removable. For cold staining a specially designed aluminum pan, not shown in the illustration, is supplied.

Dimensions over all are: length, 16 inches; width, 8½ inches; height, 6¼ inches. Supplied complete with cord and plug. **Each, $35.00**

MICROTOMES AND ACCESSORIES



SPENCER

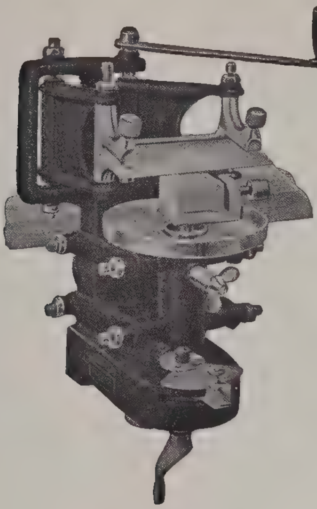
ROTARY MICROTOME

12-600

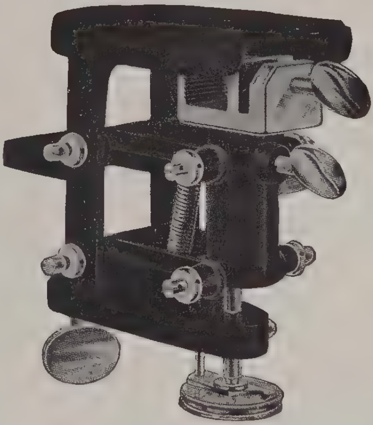
12-600. MICROTOME, Rotary, Spencer. This is a precision instrument built so that the feeding mechanism is entirely detached from the object block and the feed-screw acts against an inclined plane in such a way as to move the block by an amount smaller than the advancement of the screw. This produces a very uniform feeding device, and sections can be cut from **2 to 40 microns** (0.002 to 0.040 mm.) thick.

The clamp regularly takes a block 28 mm. wide and 16 mm. thick. There is also a provision to take blocks up to 22 mm. thick. When the clamp reaches the extreme forward position, the feed mechanism automatically ceases to work. The total excursion of the feed is 30 mm. The knife is held in the clamp very rigidly and is easily adjusted.

The microtome is finished in black crystal lacquer with nickel-plated trimmings, and supplied in a case with three object discs and one knife, knife-handle and back for sharpening. **Each, $150.00**



12-605



12-610

12-605. MICROTOME, Automatic, Spencer. This microtome, on account of its simplicity and reliability, is specially suitable for hospital laboratories for use in preparing frozen or celloidin sections. In this microtome, the main supporting frame has a heavy clamp at the back by which it can be securely fastened to the laboratory table.

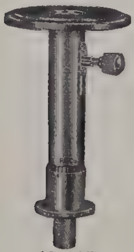
The automatic feed mechanism consists of an accurately cut ratchet wheel, keyed to the vertical feed screw, in the teeth of which a hardened steel pawl engages. By means of a lever extending to the graduated scale shown on the front of the main frame base, this pawl may be thrown out of action. Each division of the graduated scale marks **5 microns** (0.005 mm.)

The microtome is finished in alcohol-proof lacquer with nickel-plated trimmings, and supplied with one knife and one object clamp for paraffin or celloidin. **Each, $100.00**

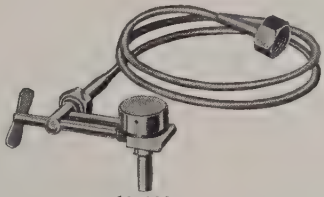
12-610. MICROTOME, Table, Spencer. This instrument is designed for use in laboratories where an inexpensive but practical apparatus is required for rapid work. Sections down to 2.5 microns (0.0025 mm.) can be cut.

The feed is accomplished by means of a simple micrometer screw having two threads to the millimeter. The screw acts directly against the lower end of the socket carrying the object block. Any section razor or microtome knife can be used with the instrument.

The microtome is finished in black alcohol-proof lacquer and supplied with heavy thumb-screw for attaching to laboratory table, but **without microtome knife.** **Each, $20.00**



12-615



12-620

12-615. MICROTOME, Hand, Spencer. This is a convenient and inexpensive microtome in which the object is placed in a clamp in the upper end of the tube, and raised through the hole in the glass plate by carefully cut screw, which is entirely enclosed and protected from dust and injury.

The feed is accurately graduated; each division represents 10 microns (0.010 mm.). The plate at the top over which the microtome knife or razor is drawn forms a firm support, and is 3 inches diameter.

The microtome is finished entirely in nickel and supplied **without knife.** **Each, $15.00**

12-620. MICROTOME FREEZING ATTACHMENT, for CO_2, Spencer. This attachment can be used with any type of microtome listed in this catalogue. It has proven to be a simple and efficient apparatus, freezing ordinary specimens in 15 to 20 seconds.

Supplied with four feet of flexible copper tubing, and connections for fitting to standard carbon dioxide tanks. **Each, $16.00**

12-625

12-630

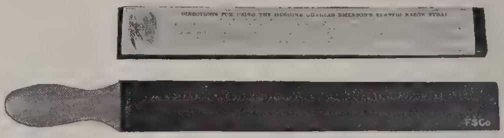
With No. 12-635 Knife Back

12-625. MICROTOME KNIFE, Spencer. The temper of this knife is exactly correct so that it will retain its cutting edge and will neither turn over nor crack off. It is made heavy and is true to shape so that when laid on a flat surface, the edge and back touch throughout their entire lengths.
Length, 110 mm. (*Will fit No. 12-600 and No. 12-605 Microtomes.*)
Supplied in plush-lined case. **Each, without handle, $8.50**

12-630. MICROTOME KNIFE HANDLE, for No. 12-625 Knife. This sharpening handle will hold the blade rigidly as though built as an integral part of the knife. The handle is finished in ebonized black, and is attached to the blade by knurled thumb-screws. **Each, $2.25**

12-635. MICROTOME KNIFE BACK, for No. 12-625 Knife. This is used for sharpening, and fits on the back of the blade to insure a straight cutting edge with the proper bevel. **Each, $1.75**

12-640



12-645

12-640. MICROTOME KNIFE, Section Razor, in folding case. This is a special razor flat on one side and hollow-ground on the other, used only for section cutting. Length of blade, 75 mm. **Each, $2.75**

12-645. MICROTOME KNIFE STROP, Emerson. The strop is made with preliminary and finishing sides which are padded to give them elasticity. This quality makes the strop act with regularity and revives the edge of the knife.

The strop is mounted on wood and has a convenient handle. Length over all, 17 inches. Supplied in a case, with a box of strop dressing. **Each, $3.00**

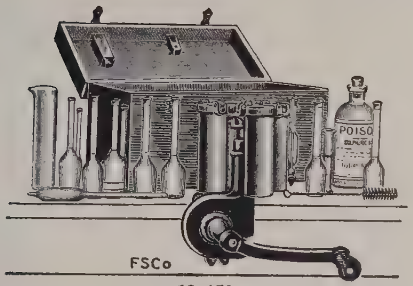
IMMEDIATE SHIPMENTS FROM STOCK

ARE MADE FROM OUR WAREHOUSES, WHICH ARE DEVOTED EXCLUSIVELY TO LABORATORY SUPPLIES

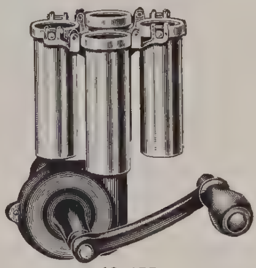
PITTSBURGH

MONTREAL

MILK TESTING APPARATUS



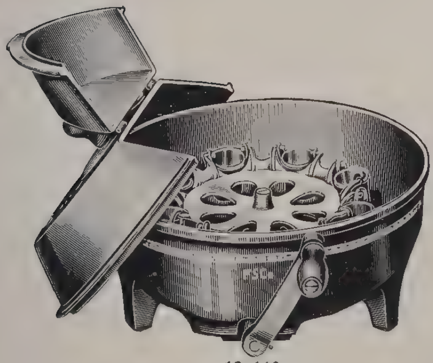
12-650



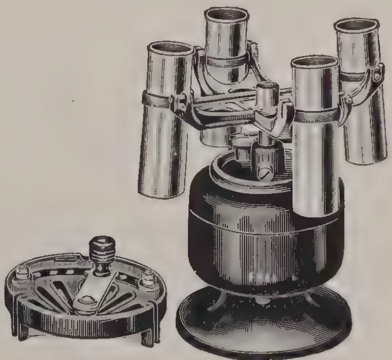
12-655

12-650. MILK TEST OUTFIT, Babcock Portable, for the rapid determination of fat content, specific gravity, and temperature of whole milk, skim milk, and cream. This outfit is a very compact light-weight set of inspectors' testing equipment which can be easily carried from place to place to determine the actual condition of the milk or cream at its source. It consists of a four bottle hand-driven centrifuge, three Babcock whole milk test bottles, two cream bottles, two double-neck skim milk bottles, a 17.6 ml. milk pipette, a cylinder for measuring the acid, a Quevenne Lactometer and jar, a glass floating thermometer, a pint bottle of acid, a bottle brush and a copy of "Booklet on Milk and Cream Testing," giving complete directions for operating the apparatus and calculating the butter yield of the material tested. Outfit is supplied complete in hardwood carrying case. **Each, $24.00**

12-655. MILK CENTRIFUGE, Four Bottle, Hand Driven. This centrifuge is similar to the one supplied with the No. 12-650 Outfit. Any of the standard 6-inch Milk or Cream Test Bottles can be used in this centrifuge. **Each, $9.75**



12-660

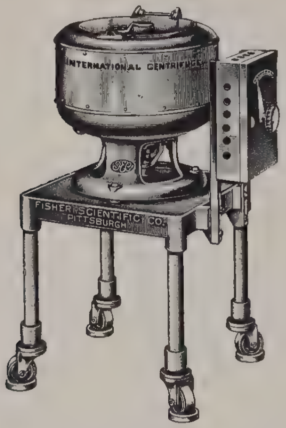


12-665

12-660. MILK CENTRIFUGE, Eight Bottle, Hand Driven. This centrifuge has a heavy cast-iron base and housing which can be bolted to the table. The cover is removable and is split and hinged so that it can be partly opened or entirely removed. The gearing is worm driven and cut from solid steel. Gearing and shafts are mounted on a separate frame, held by a yoke on the under side of the housing. All gears are entirely enclosed and packed in lubricating grease, making the centrifuge very quiet and smooth in operation. The metal cups are of seamless brass tubing, and are hung from heavily tinned, malleable trunnions. Centrifuge is supplied with eight metal cups, but without Babcock bottles. **Each, $21.00**

12-665. MILK CENTRIFUGE, Four Bottle, Electric, for use in the Babcock Test. This centrifuge has a heavy cast-iron base and housing which can be bolted to the table. The vertical shaft is of machined steel. The metal cups are removable, and are made of heavy drawn brass, spun over and soldered to malleable trunnions so that no parts can fly off during rotation. The centrifuge is regularly supplied with motor for use on 110-volt A. C.; if so specified, it will be supplied with a 110-volt D. C. motor. The rheostat supplied is necessary to start the centrifuge and increase its speed uniformly. Supplied with rheostat, cord and plug for connecting, with four metal cups, but without Babcock bottles. **Each, $58.00**

Milk Testing Apparatus



12-670
Mounted on Stand No. 12-675

12-685
Mounted on Stand No. 12-690

12-670. BABCOCK CENTRIFUGE, International, Eight Bottle, Electric. This is the centrifuge used by Milk Inspection Laboratories all over the United States. It has been designed to meet the requirements of such work.

The base is a rigid casting; motor shaft has thrust bearings; the main shaft runs on a step ball-bearing; parts are accurately machined and balanced; completely lubricated by easily accessible cups.

Speed Control Rheostat is provided; this is enclosed and protected by a case and is provided by an indicating pointer on the outside of the case. This can be attached to the wall near the centrifuge, or it can be attached to the Vibrationless Stand No. 12-675, as shown in the illustration.

Size and Finish. The centrifuge will swing the standard 6-inch bottles; it is 19 inches high over all when closed; the protecting case is 18 inches diameter; the weight is about 150 pounds. It is finished in aluminum bronze outside and white enamel paint inside.

Motor. Babcock tests require particular speeds and the motor in this centrifuge has the proper speed for the work which is somewhat slower than the speeds required for general work. The centrifuge is supplied with a 110-volt motor, or a 220-volt motor; in either case the motor will operate equally well, without any change, on alternating or direct current. In ordering, state whether for 110-volt, or 220-volt current.

Centrifuge with an 8-bottle head, with 8 Babcock trunnion cups, with speed control rheostat; without glassware, electric heater or stand.

A. For 110 volts, A.C. or D.C.	**Each, $120.00**
B. For 220 volts, A.C. or D.C.	**Each, $120.00**

For Babcock Bottles, see No. 12-700 to No. 12-720.

12-675. STAND, Vibrationless, with Electric Installation, for No. 12-670 Centrifuge. This stand is not a necessary requirement, but it is a very convenient mounting for the centrifuge. It absorbs vibrations, it is easily moved about, it brings the centrifuge to a convenient working height. The electrical connections are enclosed; the stand has a support to hold the rheostat supplied with the centrifuge and is provided with 10 feet of cord for connecting to a wall receptacle. The support is made entirely of metal; has four rubber-tired casters and is supplied with four rubber floor-saucers which cushion the casters. **Each, $35.00**

12-680. ELECTRIC HEATER, for No. 12-670 Centrifuge. This heater is placed within the enclosing case of the centrifuge and heats the air surrounding the bottles. **Each, $13.00**

12-685. MILK CENTRIFUGE, International, Sixteen Bottle, Electric. This centrifuge has all the features of No. 12-670, and has a hand brake and brush release. The hand brake enables the operator to slow the speed to where the cups fall; the brush release allows the machine to come to rest slowly.

Size and Finish: This centrifuge will swing the standard 6-inch bottles; it is 26 inches high over all when closed; the protecting case is 24 inches diameter; weight, about 240 pounds. Finished in aluminum bronze outside and white enamel paint inside.

Motor: The motor has the proper speed for Babcock tests. It is supplied to suit the current available. In ordering state the voltage, and if alternating, state the number of cycles.

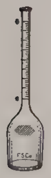
Speed Control Rheostat for the proper control of this centrifuge is supplied. It is enclosed, similar to that described with the No. 12-670 Centrifuge. Illustration shows the rheostat mounted on No. 12-690 Stand. Centrifuge is supplied with a 16-bottle head, with 16 Babcock trunnion cups, with speed control rheostat; without glassware, electric heater or stand.

A. For 110 volts, D.C.	**Each, $220.00**
B. For 110 volts, A.C. (60 cycles)	**Each, $220.00**
C. For 220 volts, D.C.	**Each, $243.50**
D. For 220 volts, A.C. (60 cycles)	**Each, $220.00**

For Babcock Bottles, see No. 12-700 to No. 12-720.

12-690. STAND, Vibrationless, with Electric Installation, for No. 12-685 Centrifuge. A very convenient accessory on which to mount the centrifuge. It is similar to No. 12-675 Stand, but made to take the No. 12-685 Centrifuge. **Each, $37.00**

12-695. ELECTRIC HEATER, for No. 12-685 Centrifuge. This heater is placed within the enclosing case of the centrifuge and heats the air surrounding the bottles. **Each, $15.00**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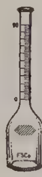
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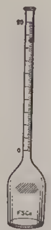
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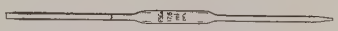
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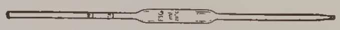
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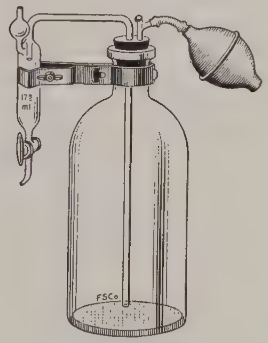

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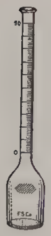
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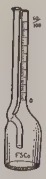
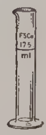

12-720



12-740

BABCOCK TEST BOTTLES

The bottles listed below have been selected from some thirty or forty different sized bottles, all designed for the same series of tests, and varying from each other only in insignificant details.

These bottles are manufactured according to the U. S. Bureau of Standards' recommendations, and approved by the Association of Official Agricultural Chemists, and the American Dairy Science Association. They meet the requirements of most of the states having Dairy Control Laws. For method, see Association of Official Agricultural Chemists' "Methods of Analysis," 227 (1919).

12-700. BABCOCK MILK TEST BOTTLE, U. S. Government Standard, 6 inch, 18 gram, 8% in 0.1% divisions. This bottle has a bulb capacity of about 45 ml. The total height of the bottle is 150 to 165 mm. (5⅞–6½ inches), while the graduated portion of the neck is 63.5 mm. (2½ inches) long. **Each, $ .45**
Per dozen, $4.80

12-705. BABCOCK CREAM TEST BOTTLE, U. S. Government Standard, 6 inch, 9 gram, 50% in ½% divisions. This is the standard cream test bottle with the neck calibrated for fat content up to 50%.
Each, $ .55
Per dozen, $6.00

12-710. BABCOCK CREAM TEST BOTTLE, U. S. Government Standard, 9 inch, 9 gram, 50% in ½% divisions. This bottle is similar to No. 12-705, but is 210 to 225 mm. (8¼ to 9 inches) high. **Each, $ .55**
Per dozen, $6.00

12-715. BABCOCK CREAM TEST BOTTLE, U. S. Government Standard, 9 inch, 18 gram, 50% in ½% divisions. This bottle is similar to No. 12-710, but has a wider neck so that an 18-gram sample can be taken for analysis.
Each, $ .55
Per dozen, $6.00

12-720. BABCOCK SKIM MILK TEST BOTTLE. This bottle has an auxiliary filling tube alongside the neck. The neck is very narrow and is calibrated from zero to 0.50% in .01% divisions. **Each, $1.25**
Per dozen, $10.00

BRUSH, for Babcock Bottles, see No. 3-635, page 105.

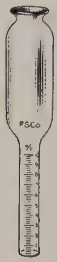
12-725. MILK PIPETTE, Government Standard, capacity 17.6 ml. For measuring the milk to be used in the Babcock Test. This pipette is made according to the recommendations of the U. S. Bureau of Standards, and approved by The Association of Official Agricultural Chemists, and the American Dairy Science Association. It is graduated to deliver 17.6 ml. of water at 20° C., in 5 to 8 seconds. **Each, $ .45**
Per dozen, $4.80

12-730. MILK AND CREAM PIPETTE. Graduated at 17.6 ml. for milk samples and at 18 ml. for cream samples.
Each, $ .55

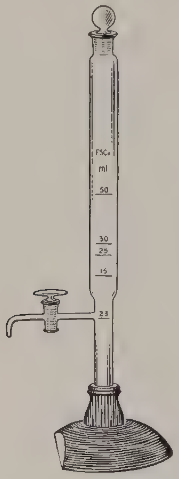
12-740. ACID MEASURE GLASS, for measuring the acid to be used in the Babcock Test. This measure is a glass cylinder with a heavy base, and pouring spout, and is graduated to deliver 17.5 ml. **Each, $ .30**
Per dozen, $3.00

12-745. ACID BOTTLE AND AUTOMATIC PIPETTE, combined. This is an improved form of acid bottle for use in the Babcock Test. This bottle has a capacity of 2 liters, and is fitted with an automatic pipette of 17.5 ml. capacity. A rubber aspirator bulb serves to force the acid into the pipette. When the pipette is full, removing the finger from the vent near the bulb, releases the pressure within the bottle and the excess acid is syphoned from the pipette back into the bottle. **Each, $6.50**

BIOLOGICAL STAINS
CHEMICALS AND REAGENTS
are listed in the rear of this catalogue

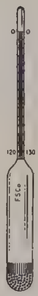


5-630

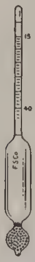


12-750

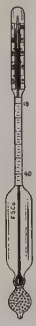
15-105



12-755



12-760



12-765

12-770

5-630. MILK CASEIN TUBE, Hart, for the determination of Casein in milk according to Hart's Method. *See Farrington and Wall "Testing of Milk and its Products," 211 (1924),* also *N. Y. Agricultural Experiment Station, Bulletin No. 68, New Series.* This tube has a total capacity of about 35 ml., the lower portion is graduated to 5 ml. (marked 10) subdivided in ⅕ divisions; each small division represents $^2/_{10}$ of one per cent casein when a 5 ml. sample is used. This tube fits in Centrifuge Metal Tube, No. 5-170. **Each, $ .75**

MILK, CASEIN DETERMINATION APPARATUS by the Kjeldahl method. See Nitrogen Determination Apparatus.

MILK COMPARATOR, Cooledge, for determining the keeping qualities of milk as indicated by the Methylene Blue Phenolsulphonephthalein and Bromcresolphthalein Tests, as described in the *Journal of Dairy Science, March, 1920, and September, 1922.* See No. 7-360 Cooledge Color Comparator, page 243.

MILK DISHES, see No. 8-730 and No. 8-735, page 293.

12-750. MILK FAT EXTRACTION TUBE, Rohrig-Biesterfield, for the determination of fat in condensed milk, milk powders and similar dairy products, according to the *Association of Official Agricultural Chemists' Methods of Analysis, 226 (1919),* and *Journal of Industrial and Engineering Chemistry, 9, 12 (1917).* This is a modified form of the Rohrig tube. It has a glass stopcock sealed near its lower end so that it will leave 23 ml. of the contents in the tube. The upper part of the tube is graduated for 15, 25, 30 and 50 ml., so that the ethers can be measured directly in the tube without using separate graduated measuring cylinders. The tube is fitted with a ground glass stopper which has a vent hole corresponding to the vent hole in the neck of the tube so that the tube can be vented during the extraction. The tube has a total height of about 460 mm. and is supplied with a weighted wooden support which is grooved to receive the beaker and funnel. **Each, $4.00**

FAT EXTRACTION PAPER, see No. 9-870, page 335.

MILK TESTER, for Lactose, by the electrolytic method of the Association of Official Agricultural Chemists, as described in their "*Methods of Analysis," pages 226–227 (1919).* See No. 9-260.

15-105. THERMOMETER, Floating, Dairy. This thermometer is about 8 inches long and has an enclosed paper scale graduated from zero to 170°F. with special markings for the freezing point, churning, cheese making and pan scalding temperatures. **Each, $ .75**

12-755. LACTOMETER, N. Y. Board of Health Pattern, Spence Scale; for determining the Specific Gravity of whole and skim milk. This Lactometer is about eleven (11) inches long and has two scales on the graduated portion about 4 inches long. One scale is divided into 130 divisions, with zero equivalent to the Specific Gravity of water, while 100 corresponds to a Specific Gravity of 1.029 which is the lowest limit of normal cow's milk at 60° F. Each division represents one (1) "Board of Health Degree" and is equivalent to 0.29° Quevenne. The other scale is divided into 120 divisions and is similarly employed for testing skim milk. **Each, $1.25**

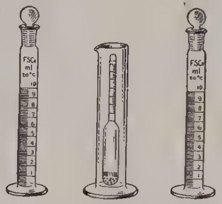
HYDROMETER JAR, for use with No. 12-755 Lactometer, see Cylinder No. 8-530, size 300 x 40 mm.

12-760. LACTOMETER, Quevenne; for determining the Specific Gravity of milk. This Lactometer is about eleven (11) inches long, by one (1) inch in diameter and has a calibrated scale about 3 inches long. This scale is graduated from 15 to 40° in 1° divisions and corresponds to the range of 1.015 to 1.040 in Specific Gravity degrees. Two auxiliary scales are provided. One indicates the percentage of water, in tenths of one per cent. in whole milk, while the other indicates the same for skim milk. **Each, $1.25**

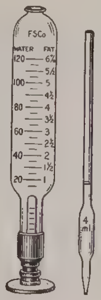
12-765. LACTOMETER, Quevenne, with Thermometer. This Lactometer is similar to the No. 12-760 Lactometer, but is equipped with a thermometer so that the readings may be referred to standard correction tables and the Gravity corrected for temperature. **Each, $3.50**

12-770. LACTOMETER, for Human Milk. This Lactometer is about 4 inches long, ⅝ inch in diameter with the scale about 1½ inches long and graduated from 1.010 to 1.040 in 0.001 divisions. With this Lactometer determinations can be made on as little as 25 ml. of milk. **Each, $1.50**

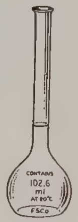
12-773



12-775



12-780



12-785

12-773. PIPETTE, Breed and Brew; made of capillary glass tubing; without bulb; for use in preparing smears. For method, see *Technical Bulletin No. 49, N. Y. Agricultural Experiment Station, Geneva, N. Y.* Graduated to deliver 0.01 ml. of milk, Sp. Gr. 1.032, at 21° C. **Each, $1.00**

12-775. MILK TESTING SET, Holt; for determining the Specific Gravity and cream content of human milk. This set consists of a hydrometer jar and hydrometer calibrated from 1.010 to 1.040° in .001° divisions; and two (2) glass-stoppered 10 ml. cylinders, with molded bases, graduated in 0.1 ml. divisions so that each division represents 1% of cream.

The complete set, in pocket carrying case, with directions. **Per set, $4.00**

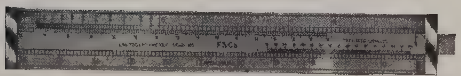
12-780. LACTOSCOPE, Fesers; for rapidly determining the fat content of milk by determining its translucency. The apparatus is a graduated dilution cylinder, graduated to read directly in percentage of fat contained in the milk. It is mounted on a removable base to facilitate cleaning. In the base is mounted a white glass rod with black lines, which serve as the reference standard.

To determine the fat content of milk, a sample, 4 ml., as measured in the pipette supplied, is introduced into the dilution cylinder and small quantities of water are then successively added until the black lines can just be seen—although indistinctly, through the diluted milk. The percentage of fat in the diluted milk varies with the volume of water added and is indicated directly on the scale reading in per cent.

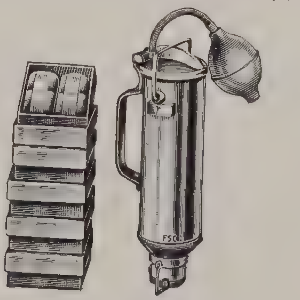
Lactoscope, complete with pipette in a wooden carrying case. **Each, $6.00**

12-785. MILK LACTOSE FLASK, for determining Lactose in milk according to the Method as described in *Mahin and Carr "Quantitative Agricultural Analysis," 213–215 (1923).* This flask is graduated to contain 102.6 ml. at 20° C. **Each, $2.00**

12-790



12-795



12-800

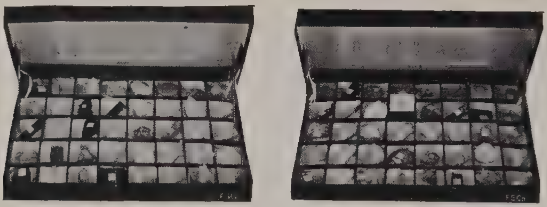
12-790. MILK LACTOSE PIPETTE, Mahin; for determining Lactose in milk according to the Methods as described in *Mahin and Carr "Quantitative Agricultural Analysis," 213–215 (1923).* This is a special volumetric pipette graduated to deliver 63.5 ml. of water at 20° C. It has a scale on its upper end, graduated from 63.50 to 64.25 ml. in .05 ml. divisions. This permits measuring the milk for the lactose determination by volume instead of by weight, and can be used with milks ranging from 1.024 to 1.036 Specific Gravity. **Each, $2.00**

12-795. MILK SLIDE RULE, Richmonds; for determining the "Total Solids" in milk. This slide rule is 12 inches long, and is constructed along the lines of the usual logarithmic rule, but has the scales calibrated for Fat, Specific Gravity, Lactometer Reading, Total Solids, and Temperature, so that the test can be rapidly calculated without the use of tables. **Each, $4.00**

12-800. MILK SEDIMENT TESTER, as devised by the Wisconsin Agricultural Experiment Station, for determining foreign matter, suspended dirt, etc., in milk. This is a simple device by means of which an inspector without chemical training can quickly determine the cleanliness of milk, cream, etc. The method consists of filtering one (1) pint of the milk through a specially prepared filter-disc which collects all the foreign matter. The discs can then be dried and filed for future reference. The apparatus is a heavy copper tank, to the top of which is attached a 2-valve rubber aspirating bulb. At the bottom is a removable copper gauge for screening out any twigs, and for protecting the filter-disc. The top is rendered air-tight by means of a rubber gasket. The entire apparatus is readily opened for cleaning. Sediment Tester is supplied complete with aspirating bulb, copper screen, and five hundred (500) filter-discs. **Each, $17.50**

12-805. FILTER-DISCS, for use with No. 12-800 Milk Sediment Tester. .... **Per 100 discs, $ .75**
Per 1000 discs, $6.00

Mineral Collections



12-810

12-815

MILLS, Grinding, are listed under Crushers, Grinders and Mills, No. 8-360 to No. 8-505.

MINERAL COLLECTION, for Blowpipe Work, see No. 2-740 on page 74.

12-810. MINERAL COLLECTION, 40 minerals and 40 corresponding manufactured products in two separate cases, 17 x 13 inches with separate compartments for each article. The manufactured product with each mineral, makes the study more interesting and enables the student to connect the two in a way that will be remembered. The table on the inside of the lid gives the number of the specimen, its chemical composition, source of supply, a manufactured product and the chief use.

MINERALS IN THE SET

Apatite
Cryolite
Bauxite
Stibnite
Asbestos
Asphaltum
Witherite
Barite
Petroleum
Ozokorite
Chromite
Tincal
Chalcopyrite
Malacite
Tripolite
Chalk
Kimberlite
Emery
Flint
Gold Quartz
Hematite
Siderite
Limonite
Galena
Graphite
Magnesite
Pyrolusite
Mica
Fluorite
Gypsum
Feldspar
Cinnabar
Halite
Pumice
Silver (Rock)
Sulphur
Talc
Cassitterite
Sphalerite
Calamine

Complete set, in two cases...**Per set, $14.50**

12-815. MINERAL AND ROCK COLLECTION, 20 minerals and 20 rocks. Each specimen is labeled and placed in a separate compartment in the cloth-covered case, 17 x 13 inches.

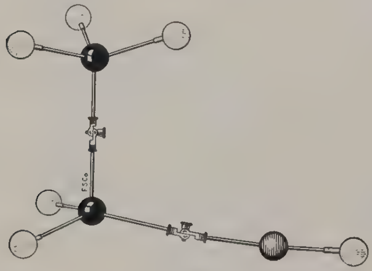
MINERALS

Asbestos
Calcite
Chalcopyrite
Fluorite
Galena
Garnet
Graphite
Gypsum
Hematite
Hornblende
Limonite
Magnetite
Quartz
Muscovite
Orthoclase
Pyrite
Quartz (Cryst.)
Siderite
Sphalerite
Talc

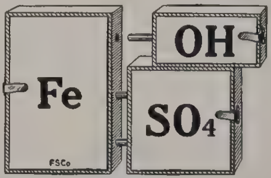
ROCKS

Basalt
Calcareous Tufa
Clay Slate
Limestone (Compact)
Conglomerate
Diabase
Sandstone
Limestone (Fossiliferous)
Gneiss
Granite
Lignite
Limestone
Marble
Mica
Peat
Clay (Potters)
Quartzite
Red Sandstone
Residual Sand
Shale

Complete set in case...**Per set, $5.50**



12-820



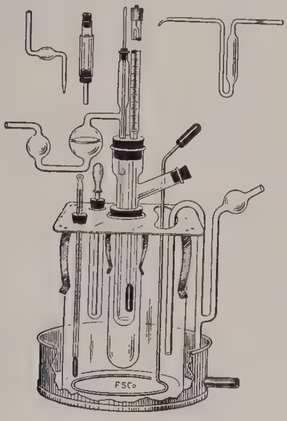
12-825

12-820. MODELS, Atomic, Kekulé and von Baeyer; for demonstrating the space or "lattice" relationship and valence of the atoms in a molecule, or the ions and protons in the atom. These models are supplied in a set of twenty (20) black colored balls with four (4) posts or "valence arms" to represent a quadrivalent atom like carbon, ten (10) red balls with two (2) valence arms for diatomic atoms, thirty (30) white balls, ten (10) yellow balls, ten (10) green balls, ten (10) violet balls, and ten (10) silver balls, each with a metallic sleeve to receive the valence arm of the polyvalent atomic model, and to represent various monovalent atoms. Fifteen (15) nickel-plated screw connectors are also supplied for showing double-linkages, bridged linkages, etc.

The illustration shows one of the many combinations possible with this set. It shows the space formula for ethyl alcohol, and is made from two (2) black balls, to represent the carbon atoms, six (6) white balls to represent the hydrogen atoms, and one (1) red ball to represent the oxygen atom. Complete set, as described. **Each, $28.00**

12-825. MODELS, Valence, Neads; for demonstrating the meaning of valence, and the substitution of one group of molecules for another group of the same valence, as an aid to the study of chemical equations. These models consist of a series of wood blocks dowelled together. The blocks representing the positive elements or radicals are provided with dowel pins which fit into corresponding holes in the blocks representing the negative radical. Each block is fitted with a clip to hold a card on which is printed the chemical symbol of a radical or element. The set includes twelve (12) blocks for univalent radicals, six (6) for bivalent, and four (4) for trivalent, and one hundred (100) cards printed with symbols of the more common elements and radicals. The illustration shows basic iron sulphate, one of the many combinations of elements and radicals possible with this set. All blocks and cards are standardized to fit each other. Complete set, as described. **Each, $10.00**

MOLECULAR WEIGHT DETERMINATION APPARATUS



12-830

12-890

15-055

12-830. MOLECULAR WEIGHT DETERMINATION APPARATUS, Beckmann—Freezing Point. Used to determine the molecular weight of a substance by determining the depression of the freezing point of a solvent containing the substance. This apparatus can be used for both hygroscopic and non-hygroscopic solvents. For technique, see *Richards "Cryoscopic Method." Journal Amer. Chem. Soc. XXV, 291 (1903).* and *Findlay "Practical Physical Chemistry," page 113 (1923).* The apparatus consists of:

Freezing Chamber of glass, with side arm through which the solutions under examination are introduced; provided with rubber stoppers. **Air Jacket,** glass, for freezing chamber, with rubber stopper. **Filling Pipette** of glass, pycnometer form; used to transfer solutions to the freezing chamber.

Inoculator of glass, sometimes called a "seeding device," consisting of a glass pipette with rubber bulb, and a glass container, test tube form, with rubber stopper through which the pipette is inserted; used to transfer "seeding" crystals to the freezing chamber.

Sulphuric Acid Tube of glass, with two (2) bulbs and glass baffle plate, to prevent the sulphuric acid from entering the freezing chamber; used with hygroscopic solutions.

Mercury Seal of glass, including a mercury pipette for filling; used with non-hygroscopic solutions.

Cooling Jar of glass, 5 inches diameter and 7 inches high; used as the container for the freezing mixture. **Cover,** nickel-plated, for cooling jar, with spring clips to fit outside the cooling jar. **Stirrer,** for freezing mixture; made of nickel-plated wire with ring 4 inches diameter, and rod 10½ inches long.

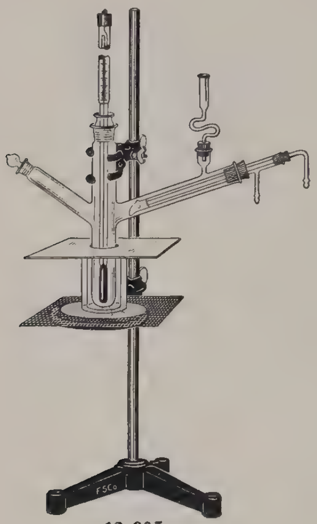
Syphon of glass, approximately 9 inches over all; used to remove excess cooling liquid without disturbing the apparatus. **Pan,** zinc, 7 inches diameter and 2 inches deep; made with outlet to carry off the freezing mixture removed by the glass syphon.

Molecular Weight Apparatus for Freezing Point Method, as described; without platinum stirrer for the freezing chamber, and without thermometers. **Each, $23.00**

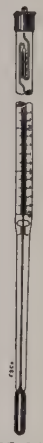
ACCESSORIES AND REPLACE PARTS FOR No. 12-830 FREEZING POINT APPARATUS

12-835.	**FREEZING CHAMBER,** of glass, with side arm	**Each, $1.75**
12-840.	**AIR JACKET,** of glass, for freezing chamber	**Each, $1.00**
12-845.	**FILLING PIPETTE, Pycnometer Form,** of glass, for freezing chamber	**Each, $1.25**
12-850.	**INOCULATOR, "Seeding Device."**	**Each, $ .60**
12-855.	**SULPHURIC ACID TUBE,** with two (2) glass bulbs and mica baffle plate; used for hygroscopic solutions.	**Each, $2.50**
12-860.	**MERCURY SEAL,** including pipette for filling; used for non-hygroscopic solutions.	**Each, $ .90**
12-865.	**COOLING JAR,** of glass, 5 inches diameter and 7 inches high	**Each, $1.50**
12-870.	**SYPHON,** of glass, about 9 inches long over all.	**Each, $1.25**
12-875.	**ZINC PAN,** 7 inches diameter and 2 inches deep, with outlet.	**Each, $2.25**
12-880.	**METAL COVER,** nickel-plated, for cooling jar	**Each, $7.00**
12-885.	**STIRRER, for the freezing mixture.**	**Each, $1.00**
12-890.	**STIRRER, Platinum Ring, for freezing chamber;** made of a glass rod and platinum ring (about 2.1 grams of wire, B & S gauge, No. 16) to fit around mercury bulb of Beckmann thermometer in freezing chamber.	**According to market price of platinum.**
12-895.	**THERMOMETER, Auxiliary,** for the cooling solution; etched stem, graduated minus 20 degrees Centigrade to plus 40 degrees Centigrade in one (1) degree divisions. Length, 415 mm.	**Each, $2.00**
15-055.	**BECKMANN THERMOMETER, Differential, Freezing Point.** Range, about 5° C.; subdivided in $\frac{1}{100}$ degrees; scale reads downward; with auxiliary scale at the top.	**Each, $18.00**

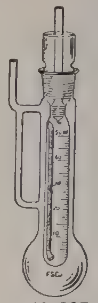
READING LENS, for thermometer, see No. 15-170, page 553.



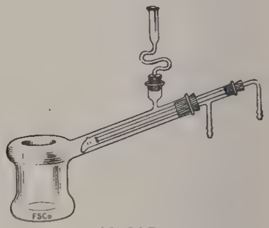
12-905



15-045



12-935



12-925

12-905. MOLECULAR WEIGHT DETERMINATION APPARATUS, Beckmann—Boiling Point; used to determine the molecular weight of a substance by determining the elevation of the boiling point of a solvent containing the substance. For technique, see "*Ebullioscopic Method,*" *Menzies and Wright, Journal Amer. Chem. Soc., XLIII, 2314 (1921)* and "*Practical Physical Chemistry,*" *Findlay, page 123 (1923).* The apparatus consists of:

Boiling Chamber, with ground-in glass adapter through which the Beckmann thermometer is inserted. The side arm for introducing the substance under examination, is supplied with a ground-in glass stopper. The other arm receives the glass condenser, and supports the mercury trap.

Double Air Jacket, consisting of two (2) concentric glass cylinders which fit around the boiling chamber. (For vapor jacket for use with low-boiling solvents, see No. 12-925.)

Mica Plate, 5 x 5 inches, with hole in center to fit around the boiling chamber.

Wire Gauze, 6 x 6 inches, with asbestos center.

Tripod Support, with nickel plated rod; with adjustable clamp and circular plate support.

Molecular Weight Apparatus for Boiling Point Method, as described, with support and clamps, without burner or thermometer. **Each, $13.00**

ACCESSORIES AND REPLACE PARTS
FOR No. 12-905 BOILING POINT APPARATUS

BURNER for No. 12-905 Molecular Weight Apparatus, see No. 4-075.

15-045. BECKMANN THERMOMETER, Differential, Boiling Point. Range, about 5° C.; subdivided in $\frac{1}{100}$ degrees; scale reads upward; with auxiliary scale at the top. **Each, $18.00**

READING LENS, for thermometer, see No. 15-170, page 553.

12-915. BOILING CHAMBER, with mercury trap, condenser in side arm, and ground-in adapter for Beckmann thermometer. **Each, $7.50**

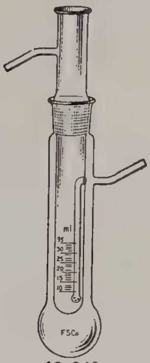
12-920. DOUBLE AIR JACKET, for boiling chamber...**Each, $1.25**

12-925. VAPOR JACKET, double walled, with condenser, for boiling chamber.......................**Each, $8.50**

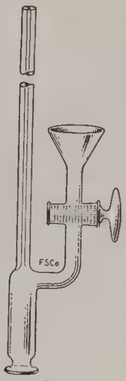
12-930. MICA PLATE, 5 x 5 inches, with hole in center to fit around boiling chamber..............**Each, $1.25**

12-935. MOLECULAR WEIGHT APPARATUS, Menzies; for the determination of the molecular weight of a substance by determining the lowering of the vapor pressure of a solvent containing the substance; as described in the *Journal of Amer. Chem. Soc. XXXII, 1615 (1910)* and *Findlay Practical Physical Chemistry, page 133 (1923).*

The apparatus consists of an outer vapor jacket for the pure solvent, about 350 mm. high, with a bulb at the bottom and a side tubulature to be connected to a reflux condenser. An auxiliary tube connects the side tubulature with the lower part of the vapor jacket, and serves as a return line for the condensate. A solution tube fits into the vapor jacket and is connected by a ground glass joint; it has a ground glass stopper, and is calibrated for 20° C. to 50 ml. and subdivided in 1 ml. divisions. This solution tube has a dip tube sealed to its upper end and extending nearly to its bottom. The dip tube is calibrated up from zero, which corresponds to 5 ml. in the solution tube, to 140 millimeters and is subdivided in 1 mm. divisions. This is used to indicate the increase in depth of the solution, and serves as an index of the difference of the vapor pressure of solvent and solution, in terms of millimeters of liquid. **Each $9.50**



12-940



12-945

12-940. MOLECULAR WEIGHT APPARATUS, McCoy; for the determination of the molecular weight of a substance by the increase in the boiling point of a solvent containing the substance. This is an improved form of the Lumsden-Walker apparatus as described in the *American Chemical Journal 23, 353, 1900* and *Findlay Practical Physical Chemistry 131, 1923*. It consists of an outer vapor jacket about 260 mm. long by 40 mm. diameter, with a bulb blown at its lower end. Near the top is a tube which serves as a filling tube and also as a vent. A solution tube fits inside the vapor jacket and is connected by a ground glass joint; this is graduated from 10 ml. to 35 ml., in 1 ml. divisions. Sealed into the wall of the solution tube, is a narrow dip tube which reaches almost to its bottom and serves to conduct the vapors from the vapor jacket, into the substance in the solution tube. The solution tube has a tubulature at the top for conducting the vapors to a condenser. The upper end of the solution tube is flared slightly to take a stopper and Beckmann thermometer. Apparatus is supplied with vapor jacket and solution tube only, without condenser or thermometer. **Each, $8.00**

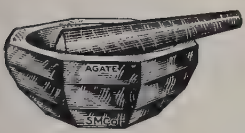
For Condenser for No. 12-940 Molecular Weight Apparatus, see No. 7-730 Condenser.

For Beckmann Thermometer for No. 12-940 Molecular Weight Apparatus, see Thermometer No. 12-910.

For Thermometer Reading Lens, see No. 3-870.

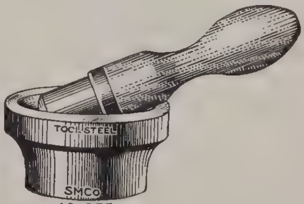
12-945. MOLECULAR WEIGHT APPARATUS, Osmotic Pressure Type; for determining molecular weights by measuring the osmotic pressure exerted by both electrolytes and non-electrolytes. See *Jones Physical Chemistry 222 (1902)*. This apparatus consists of a small bore, heavy wall glass tube 160 cm. (5 feet) long with a slight flare at its lower end, to be covered by the parchment cell. A side arm with a glass stopcock and funnel top is used for the introduction of the solvents, etc. While this apparatus was designed primarily for the determination of molecular weights, it can readily be used to study the effect of additional components in a system already under osmotic pressure. **Each, $7.00**

MOLECULAR WEIGHT APPARATUS, Traube, Stalagmometer; also used for the determination of viscosity and surface tension, see No. 5-945, No. 5-946 and No. 5-947.



12-950

Mortar Grinder
listed on page 277,
grinds quickly and
thoroughly.
It Saves Labor.



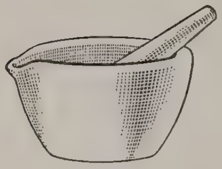
12-955

MORTARS

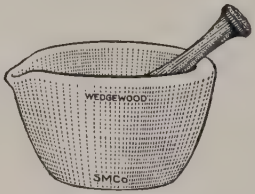
12-950. MORTARS, Agate, with pestles. The mortars are thick and heavy and are cut from selected agate; the outside shape is octagonal. Dimensions given are the outside diameters measured from side to side. The diagonal measurements are greater. Prices include pestles.

Diameter, mm.	60	75	85	100	120
Each	**$6.50**	**9.75**	**13.00**	**19.25**	**30.00**

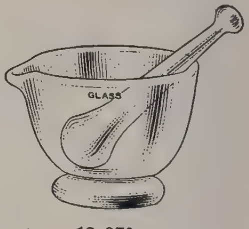
12-955. MORTAR, Tool Steel, with pestle. Made of a high grade of tool steel, then heat treated. It is exceedingly hard, although not as hard as agate; it is not so brittle and has a degree of toughness which adds materially to its resistance to abrasion. We put this mortar on the market several years ago when agate mortars were not available, and many laboratories are using them with satisfaction; some prefer them to agate. The mortar is 100 mm. outside diameter and the grinding surface of the tool steel pestle is 30 mm. diameter. The pestle is mounted in a wooden handle. **Each, $23.50**



12-960



12-965



12-970

12-960. MORTARS, Porcelain, with pestles; with lip for pouring. Mortars are glazed outside and are rough inside; the pestles are glazed with the exception of the bottoms.

*Outside diameter, mm	65	80	100	130	150	185	213
Each	**$ .25**	**.45**	**.60**	**1.00**	**1.35**	**1.60**	**1.80**

12-965. MORTARS, Wedgewood, with pestles; of hard acid-proof stoneware, with lip for pouring. The pestles have wooden handles.

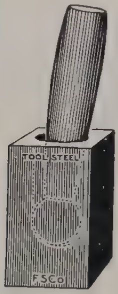
Size No.	0000	00	1	3	5	7
Outside diameter, inches	3¼	4	5	6⅜	8	10
Capacity, ounces	2	6	10	26	56	96
Each	**$1.00**	**1.30**	**1.60**	**2.20**	**3.00**	**4.25**

12-970. MORTARS, Glass, with pestles. Made of clear white glass; very heavy and strong; with heavy moulded base and lip for pouring. Supplied with pestles.

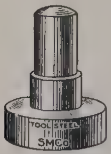
Capacity, ounces	2	4	8
Outside diameter, inches	3⅛	3½	4
Each	**$ .50**	**.65**	**.75**

Dozen lots, 10% discount

12-975



12-980



12-990

12-975. MORTARS, Iron, with pestles. Made of heavy cast iron; supplied with pestles.

Outside diameter, inches	5	6	6½	8¾	10
Capacity, pints	1	2	3	6	8
Approx. weight, pounds	6	9	12	19	31
Each	**$1.50**	**2.80**	**3.00**	**4.60**	**6.75**

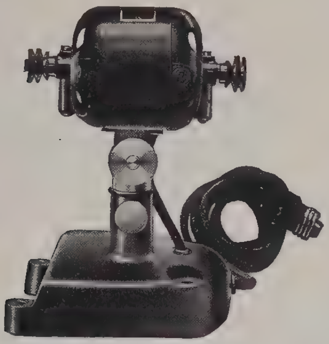
12-980. MORTAR, Crushing, Tool Steel, with pestle. To be used with a hammer, for breaking spiegeleisen, white cast iron and other very hard and tough substances. The mortar is 5 inches high and 3 x 3 inches outside; it is 3½ inches deep by 1¾ inches diameter inside. The pestle is 10 inches long with a rounded end 1⅝ inches diameter, and is shaped to conform to the bottom of the mortar. The feature of this mortar is its size and the hard, tough quality of the heat treated tool steel of which both the mortar and pestle are made. Supplied with pestle. **Each, $28.50**

12-985. PESTLE, Tool Steel, for No. 12-980 Mortar. On account of the hard usage, the pestle only may need replacing. We therefore offer these separately. **Each, $9.50**

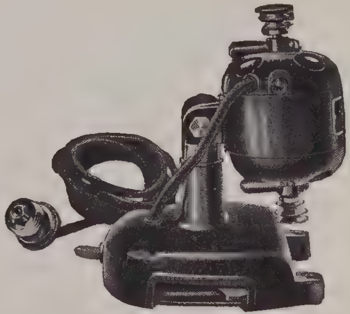
12-990. MORTAR, Diamond, Plattner's; of hard tool steel. The pestle is fitted with a metal collar which fits inside the mortar and confines the material in the mortar. The pestle is 25 mm. diameter. **Each, $8.25**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

MOTORS



12-995



Showing one adjustment of No. 12-995

12-995. MOTOR, Fisher, Universal Laboratory. A Universal Laboratory Motor which will operate on any 110-volt lighting circuit, either alternating or direct current, and at any speed desired.

This motor can be used for a number of purposes where different speeds are desired, such as driving air pumps, shaking machines, stirring devices, calorimeters, blowers, centrifuges, etc. It is very handy for demonstration and experimental work in physics and chemistry, in school and college laboratories, where small motor-power is required.

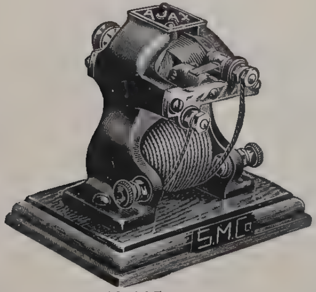
This motor is so wound that it can be used on either 110-volt direct, or 110-volt alternating current, on any cycle from twenty-five to sixty. When used with Resistance Socket No. 13-000, it can be operated on a 220-volt current. Without a load, the maximum speed, with all of the resistance in the speed-regulator cut out, is about 10,000 r.p.m. When operating under full load, this drops down to 6,000 r.p.m. at which point the motor develops $\frac{1}{30}$ horsepower. The base contains a special type of speed regulator, offering a wide range of speed control from almost zero to full speed. It allows a gradual increase or decrease in speed so as to fit any laboratory need between zero and 6,000 r.p.m. under full load.

This Fisher Universal Laboratory Motor consists of a cylindrical motor 3⅛ inches in diameter and 4$\frac{3}{16}$ inches long over the bearings. The shaft projects one (1) inch beyond the bearings on each side and is ¼-inch in diameter. To the motor housing is attached a hinge joint which makes it possible, by a thumb screw adjustment, to tilt the shaft to any position from horizontal to vertical.

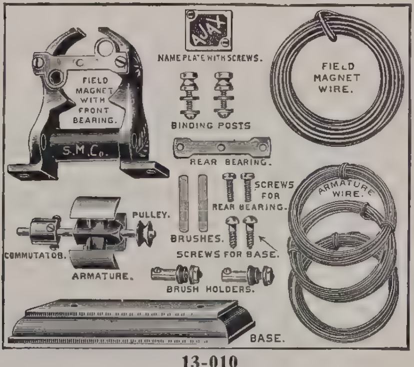
In addition to this, a swivel joint is provided so that the motor can be turned to any position with reference to the supporting base. This adjustment is also accomplished by means of a thumb screw.

Finished in Black Japan enamel with nickel trimming and furnished complete with two (2) single-grooved pulleys, five feet of cord and attachment plug, ready for attaching to a lamp socket. Weight, 8 pounds. **Each, $24.00**

13-000. RESISTANCE SOCKET, for 220 volts. For use with No. 12-995 Fisher Universal Motor. By inserting one end of this resistance into the socket of the lighting circuit and inserting the socket with the motor into the other end of the resistance, the motor can be operated on a 220-volt circuit, either alternating or direct current. Length, 5¾ inches; outside diameter, 1½ inches. **Each, $5.00**



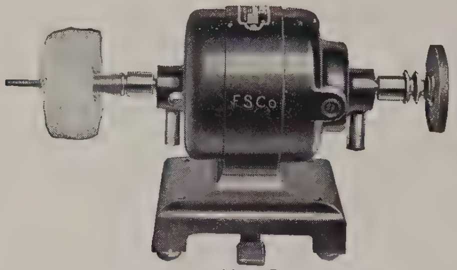
13-005



13-010

13-005. MOTOR, Electric, Ajax. Operated by battery. Finished in black enamel, nickel-plated trimmings, mounted on polished wood base 3¾ inches long by 2½ inches wide. Motor is equipped with a grooved pulley $\frac{7}{16}$ inch diameter. This motor runs efficiently on a single cell, dry or other battery. Height over all, 3¼ inches, weight about 1 lb. Directions for operating accompany each motor. **Each, $2.50**

13-010. MOTOR, Electric, Ajax, Unassembled. This is the same as No. 13-005, but is unassembled for student use. Directions accompany each set, enabling anyone to assemble the complete motor. **Each, $2.25**



13-015

13-020
See also No. 13-025

13-015. MOTOR, Grinding and Polishing, Balanced. Variable speeds, Universal. A most convenient apparatus for sharpening small tools, for cleaning and buffing and for driving small apparatus. The shaft of the motor is balanced horizontally, and the revolving parts are also balanced so that it runs without vibrations.

The motor is ⅛ h.p., with control lever by means of which four different speeds can be attained, maximum speed 10,000 r.p.m. without load. This motor operates equally well on 110 volts A.C. or 110 volts D.C. The motor is enclosed so that the grit from the grinding wheel will not get into the moving parts of the motor.

It is equipped with a 2-inch, medium grain, carborundum grinding wheel, which fits tightly to the tapered shaft without set screws; set screws cause unequal balance and, therefore, vibrations. It is also equipped with a grooved pulley for a round belt so that it can be used for driving other apparatus. A buffer is attached to a tapered screw on the other side of the shaft.

The motor is 4½ inches diameter, and the weight is 12½ pounds. **Each,** for 110 volts, **$27.50**

220-volt Universal Motors are supplied to order for.. **$29.50**

13-020. MOTORS, 110 volts, Alternating Current; constant speed, continuous service, single phase, 60 cycle, 110 volts. The ⅛ h.p. motor is supplied with a 1⅞ inch diameter grooved pulley. The ¼ h.p. motor is regularly furnished with a flat pulley, but we can supply it at the same price with a grooved pulley, 1⅞ inch diameter, if desired. If grooved pulley is not specified, we will furnish the ¼ h.p. motor with a flat pulley. The ½ h.p. motor has a flat pulley.

Horse power	⅛	¼	½
Speed, r.p.m.	1725	1725	1725
Diameter of pulley, inches	1⅞	2½	3½
Approx. shipping weight, lbs.	28	36	55
Each	**$20.00**	**22.00**	**49.00**

NOTE. The ⅛ h.p. Motor with 1⅞-inch grooved pulley, is used with Fisher Polishing Head No. 12-270. Motors for 220 volts, or of other sizes, can be furnished on short notice.

13-025. MOTORS, 110 volts, Direct Current; constant speed, continuous service, compound wound, 110 volts. The same style of pulleys are furnished with these motors as on No. 13-020 Motors.

Horse power	⅛	¼	½
Speed, r.p.m.	1725	1725	1725
Diameter of pulley, inches	1⅞	2½	3½
Approx. shipping weight, lbs.	20	30	50
Each	**$24.75**	**28.00**	**47.00**

Motors for 220 volts, or of other sizes, can be furnished on short notice.

13-030
See also No. 13-035

13-030. MOTOR, Water. It can also be used with steam or compressed air. With special clamp and holder for attaching to any ordinary apparatus stand in either horizontal or vertical position. This motor is used to drive stirrers, shakers, or other laboratory apparatus. Revolutions attained with different water pressures, are as follows:

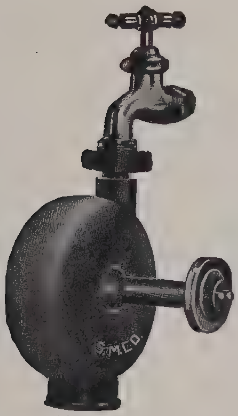
R.p.m.	2300	2800	3400	3850	4200
Lbs., pressure	20	30	40	50	60

It is supplied with nickel-plated double-grooved pulley, ¾ and 1¼ inches diameter. The inlet tube has a connection for rubber tubing, and also a pipe connection with ¼-inch iron pipe thread; outlet tube is threaded for ¾-inch iron pipe thread. Motor is finished in black enamel and is 5 inches diameter.

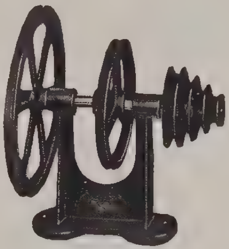
Each, $9.75

13-035. MOTOR, Water. This is the same as No. 13-030, but is supplied without the special clamp and holder.

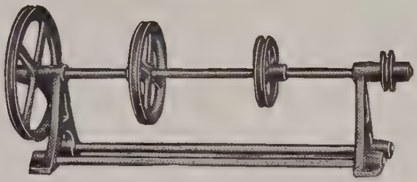
Each, $8.75



13-040



13-050

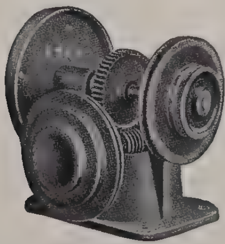


13-045

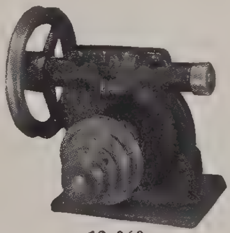
13-040. MOTOR, Water. Very powerful and noiseless. This motor is intended for attachment to the faucet by means of the brass nozzle having ¾-inch iron pipe thread, which is furnished with the motor. This connection to the faucet being a swivel, the motor shaft can be placed at any desired angle. The motor is a most powerful one for its size, giving full ⅛ horse power on 80 pounds water pressure. Diameter of motor, 4 inches; outside diameter of case, 5½ inches; weight about 4 lbs., with grooved wood pulley 1⅝ inches diameter. **Each, $6.00**

13-045. COUNTERSHAFT. This is a convenient means of obtaining the desired speed of apparatus when used with constant speed electric or water motors. The pulleys are bored and the grooves turned true with the shaft to which they are fastened. Each pulley is held by a set-screw, so that its position can be changed. Shaft is ¼ inch diameter, and 12 inches long. Pulleys are 1, 2, 3 and 4 inches diameter, and are grooved for ⅛ or 3/16 inch round belts. Net weight, about 2 pounds. **Each, $3.75**

13-050. COUNTERSHAFT. This is very desirable as a speed reducer or speed accelerator. Shaft is ⅜ inch in diameter; large pulley is 6 inches diameter; medium pulley is 4 inches diameter; the cone pulley is 1, 1½, 2 and 2½ inches diameter. Pulleys are grooved for 3/16-inch round belts. Net weight, about 4 pounds. **Each, $4.75**



13-055

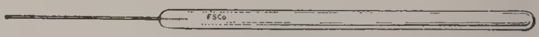


13-060

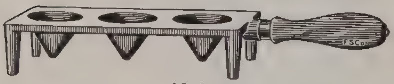
13-055. SPEED REDUCING GEAR. To reduce the speed of a motor and transmit a slow, powerful drive. The round plate can be removed if desired, and direct connection made to a shaft. The fast-running pulley has three grooves, and the slow-running pulley two grooves, giving a wide range of speeds. Diameters of 3-grooved driving pulley are 2, 3 and 4 inches; diameters of 2-grooved pulley are 2 and 4 inches. Pulleys are grooved for 3/16 or ¼-inch round belts. Geared 48 to 1. **Each, $9.00**

13-060. SPEED REDUCING GEAR. In this device the **gears are enclosed** in a case which is filled with grease. All the gears and bearings are so made and lubricated that it will run silently and without attention for a long time. Diameter of fast-running pulley, 4 inches; diameters of slow-running cone pulley, 1, 1½, 2 and 2½ inches; grooved for 3/16 or ¼-inch round belts. Geared 48 to 1. **Each, $14.00**

13-065

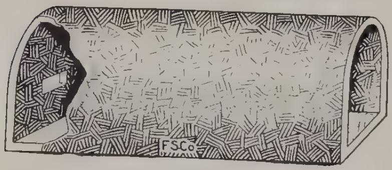


13-080
See also No. 13-085



13-070

13-090
See also No. 13-095 and No. 13-100



13-075

13-105

13-065. MOLD, Ingot. Made of cast iron. Size of mold, 7 inches long, 1½ inches wide, 1 inch high; over all length, 12¾ inches.
Each, $1.75

13-070. MOLD, Pouring. Made of cast iron, with three conical cavities, each 2 inches diameter; provided with wooden handle. Over all length, 13 inches. Weight, about 2 pounds.
Each, $1.25

13-075. MUFFLES, Denver Fire Clay. One end closed. Other size muffles can be supplied to order.

Size	C	FF	CJ	LL
Outside width, inches	4¾	6	6	9
Outside length, inches	8	10	12	15
Outside height, inches	3	4	4	5¾
Each	$2.80	3.40	4.75	5.30

13-080. NEEDLES, Inoculating. Supplied with glass handles, 6 inches long, and with No. 25 **Platinum** Wire fused into the handle.

Length of platinum wire, inches	1½	3
Each	$1.80	3.00

13-085. NEEDLES, Inoculating. Same as No. 13-080, but with 3-inch **Chromel** wire No. 26, fused in the glass handle.
Each, $ .50

13-090. NEEDLE HOLDER, Rosenberger and Greenman; for bacteriological work. The ferrule is so attached that it will not come off. Made to hold both wire and foil. Chuck is made of brass, nickel-plated, and the handle of aluminum and vulcanized fibre, preventing it from becoming hot under constant usage. Length over all, 8 inches.
Each, $ .90
Dozen lots, 10% discount.

13-095. CHROMEL WIRE, for making inoculating needles and loops. This wire is a good substitute for platinum for this purpose. It is a nickel-chromium alloy which resists oxidation more vigorously than any other base metal alloy, and is non-corrosive at normal temperatures. In coils 24 inches long.

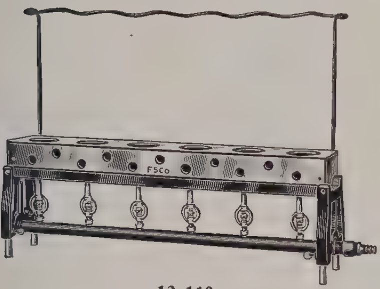
B. & S. gauge No	22	24	26	28
Per coil	$ .20	.20	.20	.20

13-100. PLATINUM WIRE, for making inoculating needles and loops, No. 25 B. & S. gauge. One foot of this wire will weigh approximately 1.1 grams.
Price, according to the platinum market.

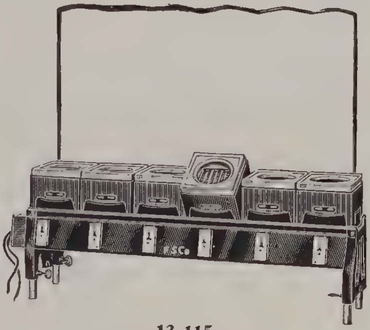
13-105. NICKEL, Sheet, Pure; in sheets 12 inches wide by 60 inches long. Very useful for covering and for making different receptacles.

B. & S. gauge No	18	22
Thickness, inches	.040	.025
Lbs. to the sheet, (approximate)	9½	6¼
Per pound	$1.20	1.20

NITROGEN DETERMINATION APPARATUS



13-110
See also No. 13-125



13-115
See also No. 13-130

For the technique of nitrogen determinations by the Kjeldahl method, see *"Methods of Analysis," Association of Official Agricultural Chemists* (*1924*).

For Nitrogen Apparatus for the determination of the nitrogen content of meats and other food products by the Van Slyke method described in *"Methods of Analysis," Association of Official Agricultural Chemists, page 245* (*1924*); also for the determination of amino groups in blood, see Van Slyke Apparatus on page 209 of this catalogue.

13-110. HEATING SHELF, Kjeldahl, Gas Heated. With removable shelf with holes to take Kjeldahl flasks; universal burners which can be adjusted for various artificial gases, natural gas or gasoline gas and can also be regulated for temperature. A support for holding the necks of Kjeldahl flasks is provided and it can be used when digestions are made under the laboratory hood.

This shelf is standardized with 5-inch centers to take 300 ml., 500 ml. or 800 ml. Kjeldahl flasks, and made so that the top support can be removed and the heating shelf used with the No. 13-135 Lead Fume Duct for digestions, or it can be used with the No. 13-120 Condenser, for distillations. The legs of the heating shelf are adjustable for height, so that it can be raised or lowered to accommodate different sized flasks, when used with the condenser. The shelf has a shield which protects the burner flames.

Number of burners and holes	6	10
Each	**$27.00**	**45.00**

13-115. HEATING SHELF, Kjeldahl, Electric. With six (6) separate electric heaters in clay mountings with holes for Kjeldahl flasks, each heater in a separate metal case and each heater has a separate trip-switch so that any or all of the heaters can be used at the same time. The wiring is contained in the shelf so that no loose wires are exposed.

The heating units are for use with a 110-volt current, and each heater draws 550 watts, and the resistance wire can be readily replaced by the operator. These heaters have many features which are described under No. 11-428. The legs of the supporting shelf are adjustable for height and the shelf is standardized with 5-inch centers. The support which holds the necks of the flasks can be used for digestions under the hood, or it can be removed and the shelf used with the No. 13-135 Lead Fume Duct. The shelf can also be used with No. 13-120 Condenser, for distillations. It is supplied with cord for connecting to a main circuit.

Each, for 110 volts, **$62.00**

This shelf can be supplied to order, for 220 volts, at the same price. It can also be supplied to order without individual switches; the same style shelf can be supplied with 10 separate heaters.

11-435. HEATING UNITS, Coiled wire only; for replacement in the heaters of No. 13-115, No. 13-130, No. 13-140, and No. 13-165.

A. For 110 volts, **Each, $1.00**
B. For 220 volts, **Each, $1.00**

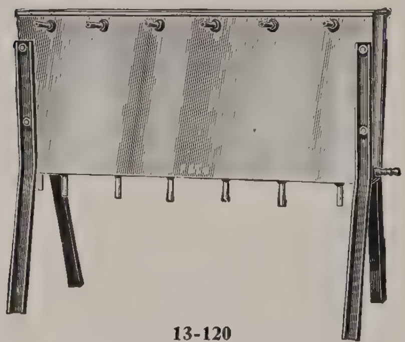
13-120. CONDENSER, Kjeldahl. Made of heavy polished copper, tin lined, with pure block tin condensing coils; the supports are made of substantial channel irons, black enameled. Provided with cooling-water inlet, with rubber tubing connection at the lower right side; an overflow pipe extending up the left side, permits complete circulation and maintains the cooling water at a constant level. (*See illustration page 474*).

The shape is tall and narrow, so that it takes up a small space on the laboratory table, and the condenser is standardized with 5-inch centers so that it can be used with either No. 13-110 or No. 13-115 Heating Shelves.

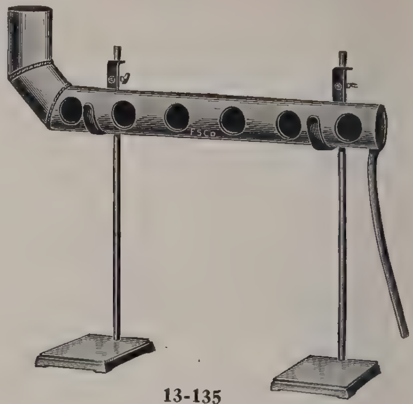
The trough is 14 inches high, 6 inches wide at the top, and 4 inches wide at the bottom. The legs support the trough 12 inches above the table so that the receiving flasks are easily inserted.

Number of coils	6	10
Each	**$43.00**	**65.00**

Nitrogen Apparatus



13-120
For description, see page 473



13-135

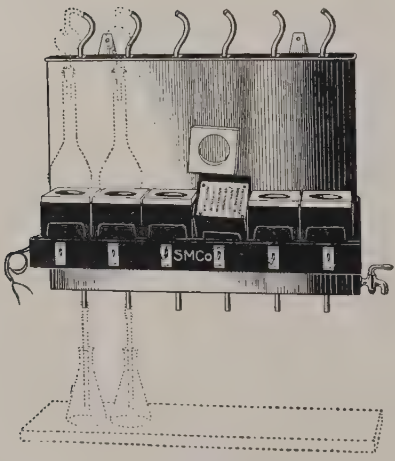
13-125. DISTILLING APPARATUS, Kjeldahl, Gas Heated. Consists of No. 13-110 Heating Shelf, and No. 13-120 Condenser.

Number of burners and coils	6	10
Each	**$60.00**	**94.00**

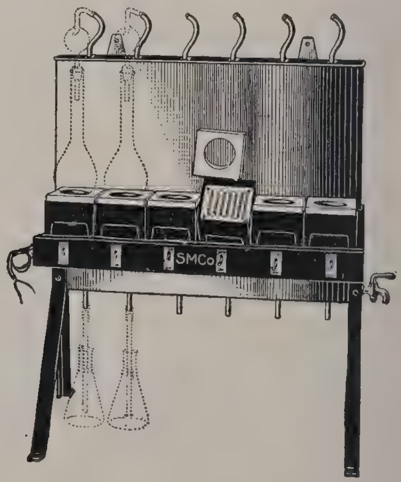
13-130. DISTILLING APPARATUS, Kjeldahl, with Electric Heaters. Consists of No. 13-115 Heating Shelf with 6 electric heaters, and No. 13-120 Condenser with 6 coils. **Each, $100.00**

13-135. FUME DUCT, Lead. A lead duct, 4 inches diameter, closed at one end and the other end open, to conduct the SO_3 fumes to the hood, or ventilating flue. With opening for the necks of Kjeldahl flasks, which also support the necks when the flasks are heated on either the No. 13-110 or the No. 13-115 Heating Shelf. This duct is also standardized with 5-inch centers. Duct is supported by two iron supports with holders which can be raised or lowered. The price includes these supports and holders.

Number of flask openings	6	10
Each	**$38.00**	**42.00**



13-140



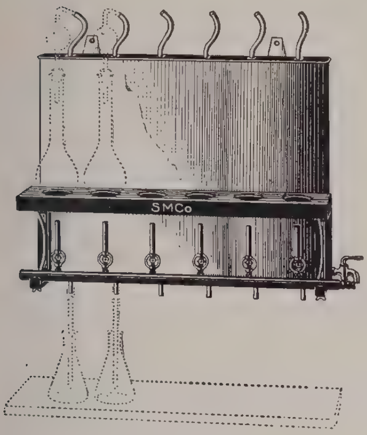
13-145

13-140. DISTILLING APPARATUS, Kjeldahl, Wall Type, with Electric Heaters. A complete distillation apparatus with tin lined, copper condensing trough with 6 block tin condensing tubes and 6 separate electric heaters, as used with the No. 13-115 Heating Shelf for 110-volt current. The heating units are easily replaced by the operator. *For extra units, see No. 11-435.* Each heater draws 550 watts and has a separate trip-switch, so that any or all of them can be used as desired.

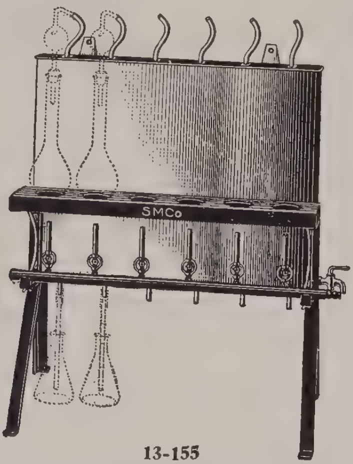
This apparatus is also standardized with 5-inch centers. The apparatus can be adjusted for different size flasks by raising or lowering the block tin, condensing pipe. It is constructed so that condensation on the bottom of the trough will not drop into the receiving flasks. The entire apparatus can be hung on the wall at a proper height above a shelf, or the table, so that the flasks for receiving the condensed ammonia water can be readily replaced and all parts can be handled from the front. It is supplied with cord for connecting to a main circuit. **Each,** for 110 volts, without glassware, **$100.00**

This apparatus can be supplied to order, for 220 volts, at the same price. It can also be supplied to order without individual switches; the same style apparatus can be supplied with 12 separate heaters.

13-145. DISTILLING APPARATUS, Combination, Wall or Table Type. Similar to No. 13-140, but equipped with a support for placing on the laboratory table. **Each,** for 110 volts, without glassware, **$107.50**



13-150

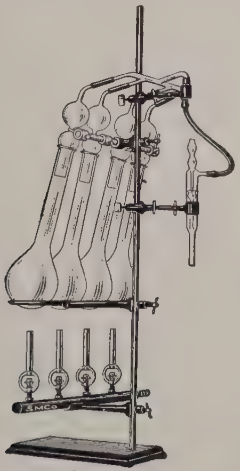


13-155

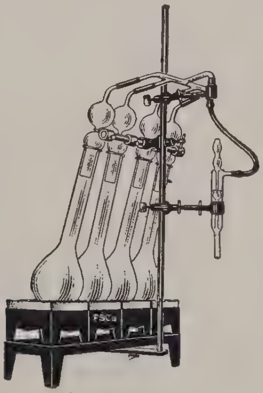
13-150. DISTILLING APPARATUS, Kjeldahl, Wall Type, Gas Heated. A complete distillation apparatus with tin lined, copper condensing trough with 6 block tin condensing tubes, supports to hold the flasks, and 6 universal gas burners, as used with the No. 13-110 Heating Shelf. The supports are adjustable for different size flasks. It is standardized with 5-inch centers.

The entire apparatus can be hung on the wall at the proper height above a shelf, or the table, so that the flasks for receiving the condensed ammonia water, can be readily replaced and all parts can be handled from the front. **Each,** without glassware, **$75.00**

13-155. DISTILLING APPARATUS, Combination, Wall or Table Type. Similar to No. 13-150, but equipped with a support for placing on the laboratory table. **Each,** without glassware, **$84.00**



13-160



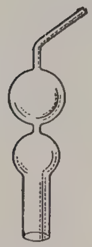
13-165

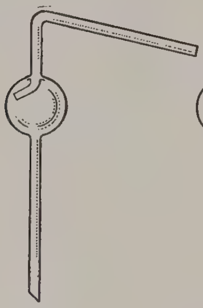
13-160. DIGESTION APPARATUS, Sy, Fumeless, Gas Heated. With this apparatus digestions can be made in the center of a room, or in places where a hood or flue is not near by, as all fumes are taken care of by the glass suction pump connected to the water supply and the waste.

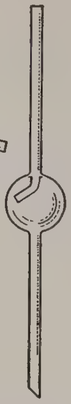
Consists of large support, holders for 4 flasks, 4 universal burners mounted in a row, support for connecting-tubes, with 4 adjustable holders, glass fume-manifold with clamp for holding it, glass suction pump with clamp for holding it, 4 Kjeldahl flasks, 500 ml., and 4 glass connecting-bulb-tubes. **Each, $25.00**

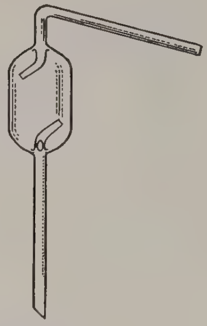
13-165. DIGESTION APPARATUS, Sy, Fumeless, with Electric Heaters. Same as No. 13-160 except that it is provided with 4 electric heaters, each one of which has a separate trip-switch; as used with No. 13-115 Heating Shelf. Supplied with glassware, etc., as described in No. 13-160. **Each, $52.00**

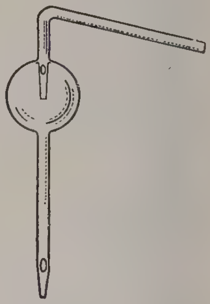
Nitrogen Bulbs


13-170


13-175


13-180


13-185


13-190

13-170. BULB TUBE, Sy, of glass; used to connect the flasks with the manifold on No. 13-160 Apparatus, and to trap the moisture. **Each, $1.10**

13-175. CONNECTING BULBS, Kjeldahl; of glass, with spherical bulb and curved outlet tube extending into the bulb. Used between the Kjeldahl flask and the Condenser. This bulb separates the liquids from the mist, and returns them to the flask, permitting the vapors to pass to the condenser.

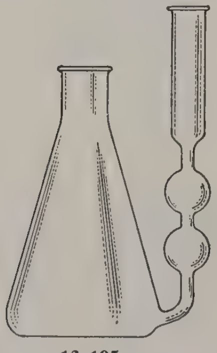
This form, with the bent tube at the top, is the most popular form, and size A is the size most used; however, size B has a larger capacity and permits more rapid distillation.

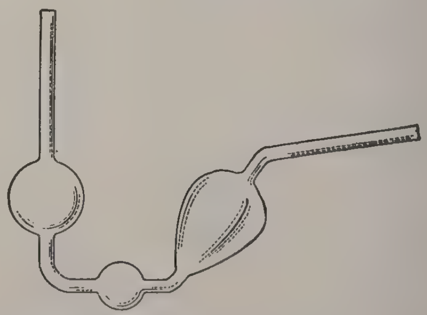
Size	A	B
Diameter of bulb, mm	52	65
Each	**$ .70**	**.80**

13-180. CONNECTING BULB, Kjeldahl, with straight outlet tube. Same as No. 13-175 except that the outlet tube, above the bulb, is straight so that it can be used in this shape or bent by the operator as desired. Diameter of bulb, 52 mm. **Each, $ .65**

13-185. CONNECTING BULB, Kjeldahl, Cylindrical; large size, as used in the analysis of cotton seed products, with curved inlet and outlet tubes extending into the bulb. These tubes are curved in opposite directions, so that the vapors will be circulated. An opening in the side of the inlet tube at the bottom of the bulb, permits the trapped liquids to return to the flask. The bulb is cylindrical and is 120 mm. long, and 55 mm. diameter. This bulb has a large condensing surface and permits rapid distillation. **Each, $1.40**

13-190. CONNECTING BULB, Hopkins; of glass, with an opening in the side of the inlet tube near the bottom, for the vapors to enter; also an opening in the side of the outlet tube, inside the bulb and near the top, through which the vapors leave. Diameter of bulb, 65 mm. **Each, $ .80**


13-195


13-200

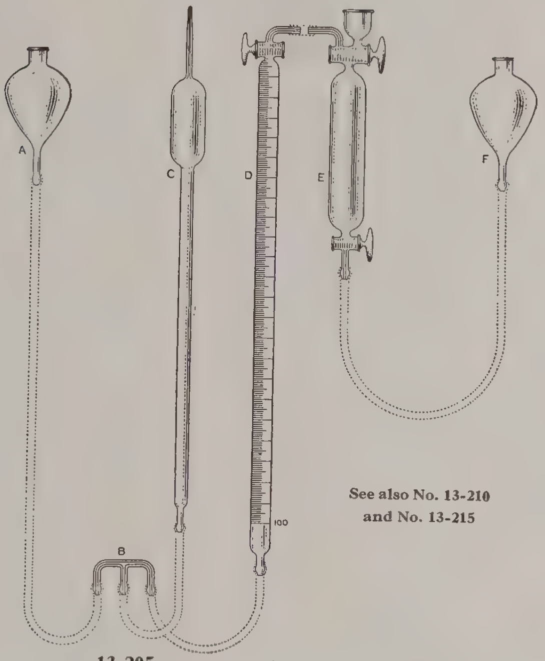
13-195. NITROGEN BULB, Volhard; of glass, for use in the iodometric determination of nitrogen in nitrates. This is the bulb for the absorption of iodine in potassium iodide. Also used for the determination of nitrogen in iron and steel. The capacity of the flask is about 300 ml. **Each, $1.25**

References, Gooch and Gruener—"Amer. Jour. of Science" (3) XLIV, page 117. Scott — "Standard Methods of Chemical Analysis," page 352 (1922). Johnson— "Chemical Analysis of Steels," page 392 (1920).

13-200. NITROGEN BULB, for Cooling; of glass, with three bulbs arranged to be immersed in a cooling bath.

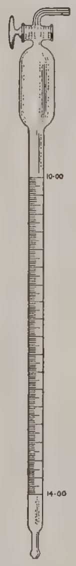
For use in the Gooch-Gruener Apparatus for determining nitrogen in nitrates, for cooling and absorbing. Total capacity of the bulbs, about 150 ml. *References, see No. 13-195.* **Each, $ .85**

NITROMETERS



See also No. 13-210
and No. 13-215

13-205



13-220
For
description
see page 478

For the technique of Nitrogen determinations by the Nitrometer method, see Scott, *"Standard Methods of Chemical Analysis, page 354, (1922),"* also U. S. Bureau of Mines, *"Bulletin No. 160."*

13-205. NITROMETER, du Pont, M.C.A. Specifications. Made according to the design and specifications of the Manufacturing Chemists Association of U. S. as shown in their "Standard Specifications, Part 1 (1922)."

Illustration shows the different parts in their relative positions, and the manner in which they are connected. These parts can be mounted with clamps and rings, on laboratory supports, or can be had with a special support designed just for this purpose; see No. 13-210. The glass parts consist of:

A. A Leveling Bulb for mercury, which is raised or lowered to vary the pressure in the apparatus.
B. A three-branch Manifold for connecting A, C, and D.
C. A Pressure Compensating Tube.
D. A Universal Measuring Tube, so calibrated that when the mercury meniscus is at the 100 mark, it will contain 240.36 ml. at 20° C. It is calibrated from zero at the top, in 100 equal divisions, each of which is subdivided in 10 divisions. The burette can be read directly in per cent, using a sample of a weight equal to ten times its molecular weight in milligrams (monobasic nitrates).
E. A Generating Bulb of about 300 ml. capacity with a two-way stopcock at the bottom, and a three-way stopcock at the top; with filling cup on top.
F. A Leveling Bulb for drawing in the sample and passing the gas from E to D.

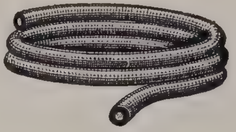
Nitrometer, du Pont; complete set of glass parts A, B, C, D, E and F, without rubber tubing or supports. **Per set, $18.00**

For special Nitro-Cotton Measuring Tube, see No. 13-220.
For Nitrometer Rubber Tubing, see No. 13-245.

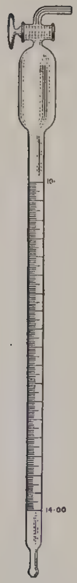
13-210. NITROMETER, du Pont, complete with Support. Consists of glass parts described under No. 13-205; the necessary nitrometer rubber tubing and a special support with fittings. **Each, $70.00**

13-215. NITROMETER, du Pont, Separate Parts. Glass parts, without rubber tubing, as described under No. 13-205. (*For Tubing, see No. 13-245.*)

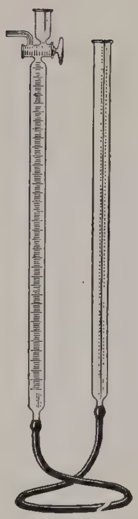
Part	A	B	C	D	E	F
Each	**$ .75**	**.50**	**2.25**	**7.75**	**6.00**	**.75**



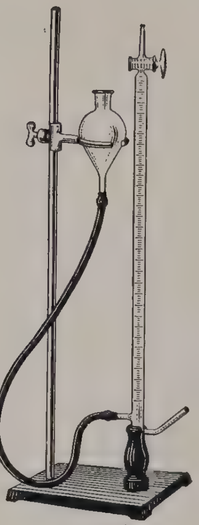
13-245



13-220
See also page 477



13-225
See also No. 13-230



13-235
See also No. 13-240

13-220. NITROMETER, du Pont, Nitro-cotton Measuring Tube. A special measuring tube for reading directly, the percentage of nitrogen in Nitro-cotton.

The tube has a bulb at the top, and is calibrated on the lower tube so that when the mercury meniscus is at the 14.01 mark, the tube will contain 240.36 ml. at 20° C. The tube is graduated from 14% up, to 10% and subdivided in $\frac{1}{100}$%.

This tube is used with the No. 13-205 Apparatus, and is substituted for Measuring Tube D. *(For Rubber Tubing, see No. 13-245.)* **Each,** without rubber tubing, **$6.00**

13-225. NITROMETER, Lunge. Consists of a measuring tube graduated from zero at the top to 50 ml. in $\frac{1}{10}$ ml. divisions; with three-way stopcock and filling cup at the top.

The gas evolved from solid substances can be drawn into the burette through the horizontal tube; liquid substances can be added through the filling cup and the gases evolved, measured directly in the burette. *Reference, Dennis—"Gas Analysis, page 397 (1918).*

Supplied with a glass leveling tube, and 3 feet of No. 13-245 Nitrometer Tubing. **Each, $6.00**

13-230. NITROMETER, Lunge, Measuring Tube. The graduated tube only, as described under No. 13-225, without rubber tubing. **Each, $4.00**

13-235. NITROMETER, Schiff. The measuring tube is graduated from the stopcock at the top to 100 ml. in $\frac{1}{5}$ ml. divisions. The lower side-tube at the bottom, is for the admission of the gas, and the lower end of the graduated tube is sealed so that a mercury trap can be used at this inlet. The other side-tube is connected to the leveling bulb which is used to control the absorbent in the measuring tube.

The measuring tube can be used for absorbing other gases, and measuring the remaining nitrogen. *Reference, Perkin and Kipping— "Organic Chemistry," Part 1, (1911).*

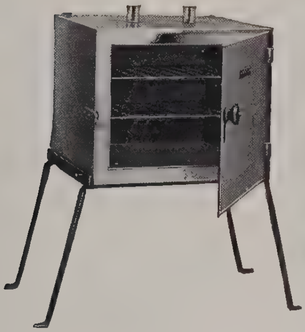
The apparatus is supplied with a leveling bulb which is held by an open-ring clamp; the measuring tube is held at the base so all graduations are visible. Furnished with an iron stand with base for measuring tube, and rod for attaching the leveling bulb clamp. Also 3 feet of Nitrometer Tubing. **Each, $10.50**

13-240. NITROMETER, Schiff, Measuring Tube only. As described under No. 13-235, without leveling bulb, stand, or rubber tubing. **Each, $5.00**

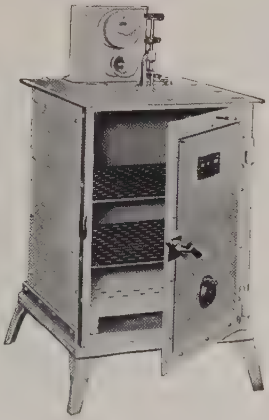
13-245. NITROMETER RUBBER TUBING. A special rubber tubing for mercury connections for nitrometers. Inside diameter, $\frac{1}{4}$ inch; outside diameter, $\frac{5}{8}$ inch. **Per foot, $ .45**

OIL TESTING APPARATUS, see Petroleum Products Testing Apparatus, pages 486-495.

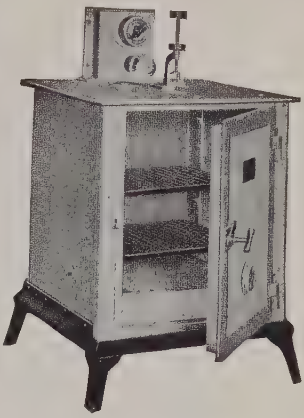
OVENS



13-255
See also No. 13-250



13-265



13-270

13-250. OVENS, Drying, Single Wall, Copper; for gas heat. Made of heavy polished copper, with separate wrought iron stands which have plates on which the ovens rest. This protects the copper bottom from the open flame, and prevents burning it. The ovens are held on the stands by two set-screws. Each oven has two openings in the top; one for a thermometer, the other for ventilation or a gas thermo-regulator. The small oven has one, and the other sizes have two removable, perforated, tinned shelves. Ovens with stands.

Size	A	B	C
Height, inches	6	8	10
Width, inches	8	10	12
Depth, inches	6	8	10
Each	**$8.50**	**11.50**	**17.00**

13-255. OVENS, Drying, Double Wall, Copper; for gas heat. Made of heavy polished copper with a jacket which can be used as an air jacket or it can be filled with water or other liquids. With separate wrought iron stands which have plates to protect the copper bottom of the ovens. Ovens are held to the stands by two set-screws. There are four openings in the top; two extend into the inner chamber and two extend into the jacket at the corners. Small oven has one, and the others have two removable, perforated, tinned shelves. Ovens with stands.

Size	A	B	C
Inside height, inches	4	6	8
Inside width, inches	6	8	10
Inside depth, inches	5	7	9
Each	**$12.50**	**17.00**	**22.00**

OVEN, Drying, Copper, asbestos covered, see Barrett Oven No. 1-525 on page 23.

OVEN, N. Y. Testing Laboratory, see No. 1-540 on page 23.

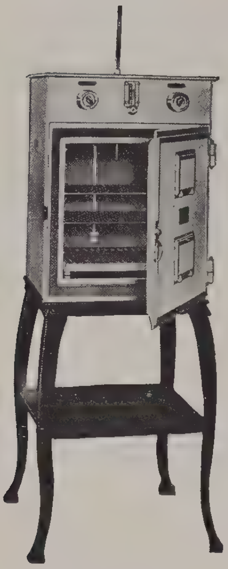
13-265. OVENS, Drying, Thelco, Single Wall, Constant Temperature, Electric. Can be operated at any temperature from that of the room up to 140° C. A very useful, convenient and inexpensive drying oven. The temperature is automatically controlled within a degree, by a bimetallic thermostat which makes-and-breaks the circuit; this is adjusted at the top of the oven without opening the door. The contact points are also outside of the chamber so that there is no danger of igniting inflammable gases.

It is constructed with heavy transite asbestos walls, set in a metal frame; the door frame is cast aluminum. Equipped with two perforated adjustable shelves; provided with a switch for turning the current on or off, and an electric pilot light which indicates when the circuit in the heater is open or closed. The chamber is ventilated by adjustable aluminum ventilators. The heating unit is heavy asbestos transite wound with Nichrome wire, and is easily removed, if desired. Supplied without thermometer, for use on 110-volt current, unless specified for 220 volts.

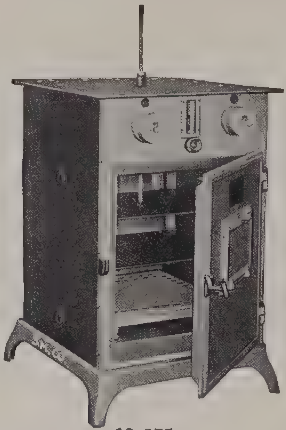
Size	A	B
Inside dimensions, inches	10 wide x 10 deep x 12 high	18 wide x 12 deep x 14 high
Watts	800	1500
Each	**$50.00**	**70.00**

13-270. OVENS, Drying, Thelco, Double Wall, Constant Temperature, Electric. These ovens have the same heaters, automatic temperature control, and are similar in every way to the No. 13-265 Ovens, excepting that they have double walls. This provides better insulation so that higher temperatures can be reached, and also makes for more efficient current consumption. These ovens can be operated at any temperature from that of the room up to 160° C. Supplied without thermometer; for use on 110-volt current, unless specified for 220 volts.

Size	A	B
Inside dimensions, inches	10 wide x 10 deep x 12 high	18 wide x 9 deep x 16 high
Watts	800	1500
Each	**$75.00**	**115.00**



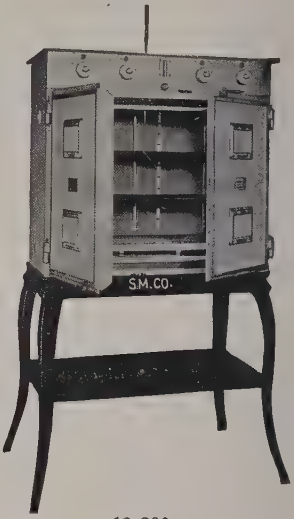
13-285



13-275

FREAS
ELECTRIC OVENS

CONSTANT
TEMPERATURE



13-290

13-275. OVEN, Freas, Constant Temperature, Electric, No. 100. This oven has a double transite wall; the space between is filled with air cell asbestos insulation. The front is cast aluminum and the door has two walls of transite, a cast aluminum frame and an observation window. A light, inside the chamber, controlled by a switch on the outside, illuminates the interior when observations are made. The chamber is ventilated by openings through the side walls and at the top.

Heat is supplied by a plate of asbestos transite, wound with Nichrome wire, placed in the bottom of the chamber where it is easily accessible. The heat is controlled by a Freas thermo-regulator which automatically opens and closes the circuit. The motion of an expansion rod is magnified and transmitted to the contacts at the top and makes-and-breaks the circuit without arcing. The lower contact point serves as an approximate indicator; this can be adjusted for the desired temperature as indicated on the scale on the front of the oven. The close adjustment of the temperature is made by observing the thermometer and adjusting the contacts accordingly.

The inside of the chamber is finished in light metallic paint; the outside is finished with a special resistant paint. **Chamber** of this oven is **12 x 12 x 12** inches; the temperature range is from room temperature to 175° C.; it operates to plus or minus ½° C. Equipped with a cast-iron base for use on a table. Supplied with a suitable thermometer 24 inches long, reading to 200° C. Supplied for use on **110-volt current,** unless specified for 220 volts. **Each, $135.00**

13-280. THERMOMETER, for use with Frease Ovens operating up to 175° C. Used with Ovens No. 13-275, No. 13-285, and No. 13-290. Range, zero to 200° C.; subdivided in 1°; length, 24 inches. The lower portion which extends into the oven, is ungraduated. **Each, $5.00**

13-285. OVEN, Freas, Constant Temperature, Electric, No. 108. The construction, heating and automatic control of this oven is similar to that of No. 13-275, except that it is larger and provided with a substantially built, detachable, cast-iron stand, which brings the oven to a convenient working height.

The inside dimensions of the heating **chamber** are **16 inches wide, 14 inches deep and 16 inches high.** The oven can be operated to maintain any degree of heat from room temperature to 175° C. A special incubator thermometer calibrated 200° C. is supplied and can be replaced by No. 13-280.

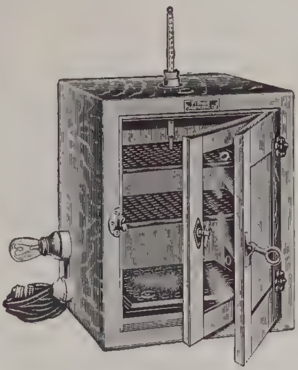
Unless otherwise specified, the oven will be furnished for use on 110-volt current. Ovens for 220-volt current can be supplied at the same price. **Each, $245.00**

13-290. OVEN, Freas, Constant Temperature, Electric, No. 140. The construction, heating, and automatic control of this oven is the same as No. 13-275. **Chamber** of this oven is **32 inches wide, 18 inches deep, and 22 inches high.** For use at temperatures up to 175° C.

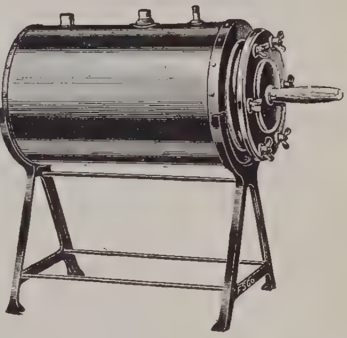
This oven has two doors, and is equipped with a substantial cast-iron stand which brings the oven to a convenient working height. Supplied with a 200° C. thermometer. Supplied for use on **110-volt current,** unless specified for 220 volts. Watts 1500. **Each, $400.00**

FREAS OVENS—HIGH TEMPERATURE

13-295
See also No. 13-305



13-310



6-690

13-295. OVEN, Freas, High Temperature, Electric, No. 104; for use at temperatures up to 260° C. This is the No. 13-275 Oven with the automatic control, but is equipped with higher resistance units. It is equipped with double switches for controlling the heating units; and can be turned off separately after the oven has reached the desired temperature. Watts 1500.

Chamber is 12 x 12 x 12 inches; equipped with cast-iron base for use on a table. Supplied with a 300° C. thermometer. Supplied for use on **110-volt current,** unless specified for 220 volts.

Each, $165.00

13-300. THERMOMETER, for use with Freas High Temperature Ovens No. 13-295 and No. 13-305. Range, zero to 300° C., subdivided in 1°; length, 24 inches. The lower portion which extends into the oven, is ungraduated. **Each, $6.00**

13-305. OVEN, Freas, High Temperature, Electric, No. 114. This oven is similar to No. 13-295, except that it is larger and mounted upon a substantially built, detachable, cast-iron stand, which brings the oven to a convenient working height.

The inside dimensions of the heating **chamber** are **14 inches wide, 17 inches deep and 18 inches high.** The oven will attain a temperature of 260° C. and the automatic control is equipped with double switches for controlling the heating units, one of which can be turned off after the oven has reached the desired temperature. A special incubator thermometer calibrated to 300° C. is supplied and can be replaced by No. 13-300.

Unless otherwise specified, the oven will be furnished for use on 110-volt current. Ovens for 220-volt current can be supplied at the same price. **Each, $285.00**

OVEN, Freas, Electric, with revolving shelf, see No. 1-530 under Asphalt Testing, on page 23.

13-310. OVENS, Paraffin, Embedding, Constant Temperature, Electric. Made of well seasoned quarter-sawed oak, lined with transite, insulated with animal hair and two layers of impregnated paper. The thermoregulator is the disc type which expands, contracts, and makes-and-breaks the circuit through the heater. The heater is made with Nichrome wire coils. The regulator can be adjusted to maintain any constant temperature from room temperature up to 60° C. The 3 P size has a glass door; the 11 P size has an inner door of glass and an outer door of wood. Supplied for use on **110-volt current,** unless specified for 220 volts.

Size No.	3 P	11 P
Inside height, inches	12	15
Inside width, inches	9	12
Inside depth, inches	9	10½
Each	**$43.00**	**69.00**

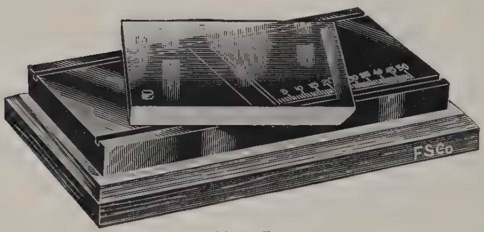
6-690. OVEN, Drying, Vacuum; for drying at temperatures up to 200° C., and at reduced or increased pressures up to 20 inches.

The oven contains a cylindrical drying chamber surrounded by an annular water jacket. The ends of the oven are cast brass; the front is a flanged door sealed by means of a rubber gasket and six wing-nuts. The oven is supported by a heavy cast-iron stand. The drying chamber is 16 inches long by 6 inches diameter. The oven is 18 inches long by 11 inches wide by 20 inches high. A tubulature extends into the drying chamber, through which a thermometer can be inserted.

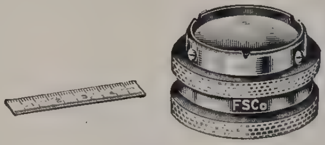
Liquids of different boiling points can be used in the jacket, and the oven operated at constant temperature. At the rear of the oven are two hose connections for the drying gas, air, hydrogen or carbon dioxide. Air thoroughly dried by passage through sulphuric acid, is usually employed. The gas is introduced through the lower connection and passes out through the upper connection.

Oven, without thermometer or burner. **Each, $70.00**

PAINT TESTING APPARATUS



13-315



13-318

REGARDING PAINT TESTING APPARATUS

As the Paint and Varnish Industries are just beginning to standardize on apparatus used in testing paints and painting materials, we are illustrating and describing such apparatus as has already been standardized, and other apparatus, which, while not as yet standardized, is being used by some of the largest manufacturers.

COLORIMETER, Lovibond, for measuring the colors of paints, varnishes, stains, films, pigments, etc., see Lovibond Tintometers, pages 240 to 242.

COLORIMETER, Stammer, for measuring the colors of oils, varnishes, paint vehicles and thinners. See No. 7-365 on page 243.

13-315. CRYPTOMETER, for determining the hiding power of paints and pigments. This instrument was designed to displace the inaccurate ultra-marine blue rub-down test, and the time consuming paint-and-weather tests, by an accurate test which takes very little time. This test is reproducible and gives an index of the number of square feet which one gallon of paint will cover and hide.

The apparatus consists of a black plate glass with an optically flat upper surface. A transverse groove about 2 mm. deep and 1 cm. wide, is cut into the upper surface of this black plate, and serves as a paint well. A millimeter scale is etched on this plate and serves as a reference scale for calculating the film thickness. A clear glass plate with optically flat surfaces, rests on the black glass plate, but is inclined to it at a slight angle by means of steel wedges attached at one end. The paint is placed in the well between the two glass plates and forms a wedge-shaped film which terminates abruptly at the edge of the well. By moving the upper glass, a position can be obtained at which the line of demarkation between the well and the wedge, just disappears, or is just hidden. By knowing the angle of the wedge and the reading on the scale, the thickness of the layer at that point, and the number of square feet per gallon, can be obtained by referring to tables furnished with each instrument.

The cryptometer is made in two (2) types: one (1) for whites and light colored paints, and one (1) for blacks and darker colored paints. They are practically the same, differing only in the nature of background employed.

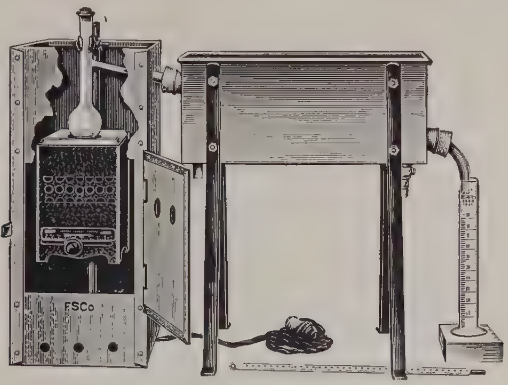
Type A, for white paint, **Each, $22.00**

Type B, for dark paint, **Each, $24.00**

DAYLIGHT LAMP, for use with No. 13-315 Cryptometer, see No. 7-265, page 239. This lamp is not necessary to the test, but its use permits the test to be made each time under the same light conditions.

13-318. PAINT FILM GAUGE, Pfund; for determining the thickness of a coat of wet paint, varnish, lacquer, etc. By determining the thickness of a coat of wet paint, it is possible to make exposure tests with films of known thickness and so obtain comparable results. The shrinkage of films on drying, number of coats or films necessary, and the variation in hiding power with degree of drying, can all be determined with this gauge. It is also used as a control for film thickness in spray painting where uniform films must be obtained. (*The illustration shows the lens end of the gauge.*)

The gauge consists of a convex lens mounted in a short aluminum tube which slides freely in an outer tube, and is kept in position by means of compression springs. The gauge is rested on the newly painted surface, and the lens pressed downward into the surface as far as it will go, and then the pressure released before removing the gauge. A circular spot is left on the lens, and the diameter of this spot is then measured in tenths of a millimeter by means of the steel scale supplied. From this measurement, referred to a table supplied with the instrument, the thickness of the paint film and the number of square feet of surface covered by one (1) gallon of paint at that thickness, can be readily determined. By actual test this gauge has been found to check calculated film thicknesses to within 3%. **Each, $19.00**



13-320
See also No. 13-325

13-320. TURPENTINE DISTILLATION APPARATUS, Electric; for the distillation of turpentine, light oils, and thinners according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 13-24.* This apparatus consists of a standard Engler flask, iron flask support, a flask shield, electric heater, special turpentine thermometer, special tin lined copper condenser, and a glass receiver.

Flask. The flask is a standard Engler distilling flask of Pyrex glass, 100 ml. capacity; diameter of bulb, 65 mm.; length of neck, 150 mm.; diameter of neck, 16 mm.; length of vapor tube, 100 mm.; sealed to neck at an angle of 75 degrees to the vertical and at such a height that when the flask contains 100 ml. of liquid, the surface of the liquid is 90 mm. below the bottom of the junction of the side tube and neck.

Flask Support. This support has a cast-metal base with an iron supporting rod screwed into it. The rod carries an adjustable clamp for the flask, and takes the clamp of the electric heater.

Flask Shield. The shield is made of 22 gauge galvanized sheet iron about 48 cm. (19 inches) high by 28 cm. (11 inches) long and 20 cm. (8 inches) wide with a hinged door in one of the narrow sides.

Electric Heater. The electric heater has a replaceable heating element of "Chromel A" wire wound across a high-temperature refractory. Above the coil is an asbestos block with a central hole 1½ inches diameter. The rheostat is mounted below the refractory and is operated through a rack and pinion actuated by a knob at the front of the heater. The knob moves across a graduated scale so that the heater can be reset at any predetermined temperature. The heater has a sheet-iron housing which is finished in black crystallized lacquer, and has a clamp which holds the heater on the support rod. The heater is supplied with a cord and plug for connecting to an electric light socket.

Thermometer. The thermometer is a standard A.S.T.M. Turpentine Thermometer, graduated from 145° to 200° C. in 0.2° subdivisions. It is nitrogen-filled and complies with the A.S.T.M. specifications.

Condenser. The condenser has a 14.29 mm. brass tube, about 560 mm. long with the lower end curved to fit into the receiver. It is surrounded by cooling jacket, approximately 380 mm. (15 inches) long, by 100 mm. (4 inches) wide, by 150 mm. (6 inches) deep, which has a water inlet at the bottom and a constant level overflow tube near the top. The jacket is made of heavy copper, tinned on the inside and is supported by iron legs. **Receiver.** The receiver is a standard 100 ml. glass cylinder, made according to the A.S.T.M. specifications, D 13-24.

Complete apparatus as described, for use on either 110 or 220 volt current. **State current when ordering.**

A. For 110 volt current, **Each, $45.00**
B. For 220 volt current, **Each, $45.00**

13-325. TURPENTINE DISTILLATION APPARATUS, Gas Heated; for the distillation of turpentine, light oils, and thinners, according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 13-24.* This apparatus is similar to No. 13-320 Electric Turpentine Distillation Apparatus, but is supplied with a Pittsburgh Universal Gas Burner instead of the electric heater. It has a ring support for the flask and a clamp for supporting the burner. Complete with A.S.T.M. Turpentine Thermometer and rubber tubing for connecting the burner. **Each, $32.00**

13-330. THERMOMETER, A.S.T.M. Turpentine; used with No. 13-320 and No. 13-325 Distillation Apparatus. Range, from 145° to 200° C., divided in ⅕-degree subdivisions; nitrogen-filled, and complies with A.S.T.M. specifications. **Each, $8.00**

FLASK, Engler, for Turpentine Distillation Apparatus, see No. 10-145.

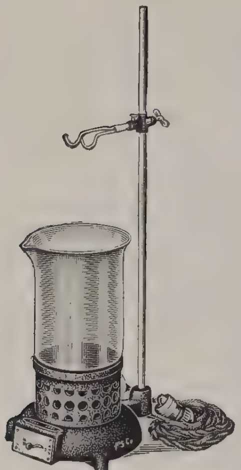
RECEIVER, A.S.T.M., for Turpentine Distillation Apparatus, see No. 13-475.

DROPPING POINT APPARATUS, for the determination of the dropping point of impregnating varnishes, compounds, etc., and for determining the melting points of waxes, resins, and similar fillers. See No. 1-550 Low Softening Point Apparatus on page 24; also No. 1-665 High Softening Point Apparatus on page 27.

HYDROMETERS, for determining the Specific Gravity of turpentine, thinners, etc. See No. 11-515 Thermo-Hydrometer, Specific Gravity range, 0.700 to 1.000; also No. 11-565 Thermo-Hydrometer, Beaumé range 70 to 10 degrees.

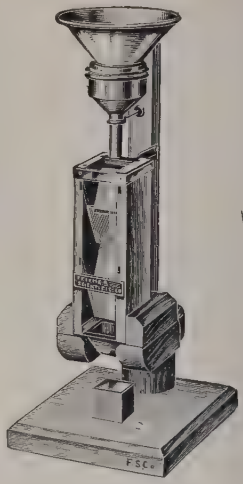
LIGHT RESISTANCE TEST APPARATUS, for determining the resistivity of paint and varnish films and pigments to light, see No. 7-150 Fadometer on page 233.

Paint Testing Apparatus



13-340

13-345
See also No. 13-350



13-355

13-340. FILM RESISTANCE APPARATUS, for determining the resistivity of paint and varnish films to the action of hot oil and water. This apparatus produces a result similar to that obtained by "weathering" and gives results, in a few hours, which are comparable to those obtained by weeks of weathering.

The Method. A charge of 500 ml. of water is placed in the boiling vessel, 200 ml. of light machine oil (or other oil as desired) is carefully poured on top of the water and the water brought to a rapid boil. Prepared test pieces, made by baking films of the paint on strips of copper 2 inches by 5 inches, are then suspended from a glass rod into the boiling liquid and examined, at fifteen or thirty minute intervals, for softening of film, peeling, solubility, etc.

An index of weathering is obtained by noting the time, in minutes, elapsed before the film is visibly affected, i.e., shows blistering, loosening, etc. A good film should show no change after four hours' treatment. Poor films break down in a much shorter time.

The apparatus consists of an electric heater, glass boiling vessel and clamp for supporting the test pieces. The heater is mounted on a cast-iron base with a clamp supporting rod fastened to the base at the rear. The heater has a replaceable heating unit of Nichrome ribbon embedded in a high temperature refractory. The boiling vessel has a capacity of one (1) liter, and is made of Pyrex glass which has a low coefficient of expansion and will not crack as readily as ordinary glass. The clamp has two arms for supporting the test pieces and can be raised or lowered. Apparatus is supplied with connecting cord and plug.

A. For 110 volt current, **Each, $14.00**
B. For 220 volt current, **Each, $14.00**

PAINT PYCNOMETER, for determining the Specific Gravity of pigments according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 153-24.* See No. 3-230, 50 ml. capacity, on page 94.

13-345. PAINT SIEVE, with U. S. Bureau of Standards Stamp of Approval; for determining the quantity of coarse particles in Paint Pigments according to the *A.S.T.M. Standard Methods for 1924, Serial Designations D 81, 82, 83, 85-24 and D 84, 185 and 186-24T.* This sieve is a standard No. 325 Sieve; diameter, 3 inches, with the mesh made according to the U. S. Bureau of Standards specifications. This sieve has been tested and approved for this purpose, by the U. S. Bureau of Standards. This sieve is intended for use as a standard, to standardize other sieves used in control testing. **Each, $13.25**

13-350. PAINT SIEVE, without U. S. Bureau of Standards Stamp of Approval. This sieve is similar to No. 13-345 Sieve, and is taken from the same stock but supplied without the Bureau's stamp. It is recommended for use in the routine testing of pigments, and can be standardized against a No. 13-345 Sieve. **Each, $10.00**

13-355. PAINT VOLUMETER, Scott; for determining the weight of one (1) cubic inch of pigment. This volumeter measures the degree of subdivision or fluffiness of a pigment, and gives an index of the covering power of the pigment. It is also used to determine the fineness of red lead and litharge used in the manufacture of storage batteries.

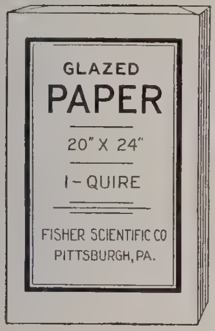
The apparatus has a large brass funnel with a metal screen for supporting the bolting cloth used in sifting the pigment, and a smaller funnel with a straight stem for directing the sifted pigment into the baffle box. This box has a series of glass baffle plates which regulate the fall of the pigment. A funnel at the bottom collects the pigment and directs it into the cubic inch receiver. This is a nickel-plated box with a capacity of exactly one (1) cubic inch, and is supplied with a counterpoised weight.

The pigment, sifted at the top, is baffled in its fall so that it actually enters the cubic inch receiver at the bottom under constant head, which insures the receiver being packed in the same manner each time. The receiver and contents are weighed and the weight of the pigment obtained. This can be referred to the weight of a standard pigment, water, or other standards of comparison. The smaller the weight of the cubic inch, the greater the covering power of the pigment.

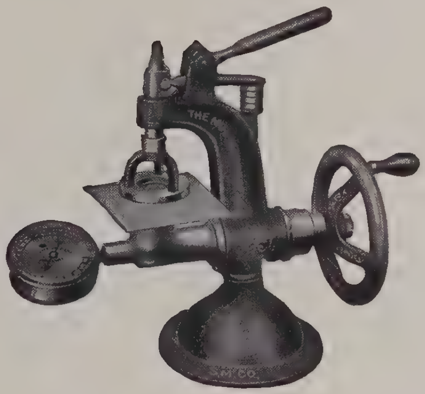
Volumeter, as described, with one (1) cubic inch receiver and counterpoise. **Each, $25.00**

13-380

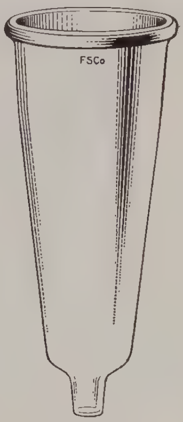
13-385



13-360



13-370



13-390

PAPER, Botanical Drying, see page 76.

13-360. PAPER, Glazed; of different colors in sheets 20 x 24 inches, glazed on one side. Used for collecting, transferring, and for weighing ash and precipitates; also for different color backgrounds. Specify color when ordering.

Color	White	Black	Blue	Yellow
Per quire	$ .85	.85	.85	.75

PAPER, Emery, see Emery Paper No. 9-540 and No. 9-545, page 324.
PAPER, Filter, see Filter Paper No. 9-790 to No. 9-945, pages 332-339.
PAPER, Lens, see No. 11-995, page 427.
PAPER, Parchment, see Dializer Paper No. 8-660, page 290.
PAPER, Sand, see Sand Paper, page 518.
PAPER, Test, see Test Paper, page 543.

13-370. PAPER TESTER, Mullen; for testing the strength of paper, fibre board, textiles, etc. This tester automatically registers the resistance to rupture, in pounds per square inch. The material to be tested is clamped over the end of a cylinder which has a rubber diaphragm on the end and is filled with liquid. This liquid is hydraulically compressed by means of the hand wheel, causing the rubber diaphragm to press against the material under test, until it is ruptured. A gauge attached to the oil hydraulic system, indicates the pressure in pounds per square inch. At the breaking point, the indicator on the gauge remains stationary, so that the pressure can be read after the test. By pressing a button at the side of the gauge, the indicator is returned to zero preparatory to another test. The standard size Mullen Paper Tester, for use on ordinary paper, has a gauge registering up to 160 pounds per square inch, and will be supplied under this number. Other sizes for particular purposes will be quoted on request.

Supplied with gauge registering up to 160 pounds per square inch. **Each, $127.50**

PARAFFIN OVENS, see Ovens No. 13-310, page 481.
PENCIL, Diamond Point, see Diamond, No. 8-675, page 290.

13-380. PENCILS, Wax, Blaisdell; for writing on glass, porcelain, or metal. Enclosed in hard rolled paper, one short section of which can be broken and unwound, thereby avoiding any cutting. Specify color when ordering.

Color	Blue	Red	Black	Yellow
Each	$ .20	.20	.20	.20
Per dozen	$1.80	1.80	1.80	1.80

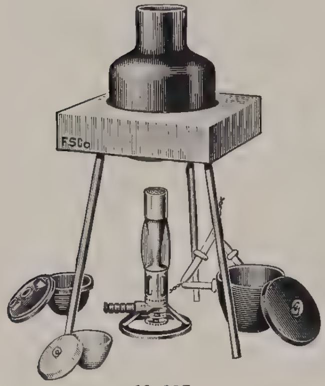
13-385. PENCILS, Wax in Wood. Encased in wood similar to the usual lead pencil. Used for writing on glass, porcelain, or metal. Specify color when ordering.

Color	Blue	Red	Yellow
Each	$ .15	.15	.15
Per dozen	$1.40	1.40	1.40

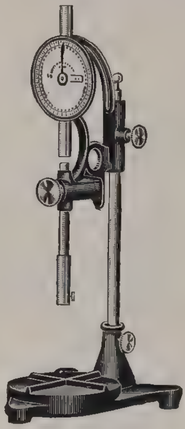
13-390. PERCOLATORS, heavy glass; conical shape.

Capacity, gallons	¼	½	1	2	3	5
Each	$ .95	1.50	2.45	4.25	7.25	13.50

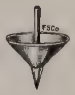
PETROLEUM AND PETROLEUM PRODUCTS TESTING APPARATUS



13-395

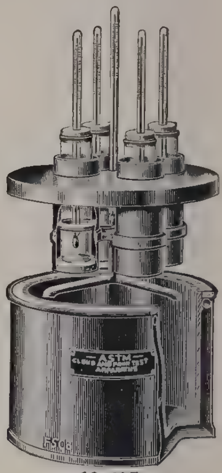


13-400



13-400
Fig. 1.

13-403



13-405

REGARDING PETROLEUM TESTING APPARATUS

The recent standardization work on the chemical and physical tests of petroleum products has progressed to the state where standardized apparatus for conducting these tests can now be offered. The apparatus listed complies with the requirements of these tests insofar as they have been standardized.

Our chemists are in touch with the work of the various organizations engaged in the standardization of tests for petroleum products, and endeavor to keep our apparatus abreast with this work. For Shale Oil Testing Apparatus, see page 520.

13-395. **CARBON RESIDUE APPARATUS, Conradson;** for determining the carbon residue of lubricants according to *A.S.T.M. Standard Methods for 1924, Serial Designation D 189-24 T.* This apparatus consists of a glazed porcelain crucible, wide form, of 25 ml. capacity; a skidmore iron crucible 45 ml. capacity, 65 mm. diameter by 38 mm. high, with cover but without delivery tubes; a wrought iron crucible with cover about 180 ml. capacity, 80 mm. diameter by 60 mm. high; a pipe-stem triangle, sheet iron hood, asbestos block, tripod, and a Fisher burner, as illustrated. **Each, $14.00**

CALORIMETER, for determining B.T.U. values of oils, synthetic fuels, etc., see pages 128 to 135.

13-400. **GREASE CONSISTOMETER,** for determining the consistency of both hard and soft greases. This consistometer is built according to the specifications of the *A.S.T.M. Standard Methods for 1925.*

It has a special mushroom-head penetration "needle" (Fig. 1.) loaded to a total weight of 150 grams. This is supported by a spring clamp. Consistency or hardness is determined by releasing the clamp and measuring the depth, in millimeters, to which the needle penetrates the grease. This is done by adjusting the gauge rod to touch the top of the needle holder before and after the test, and reading the depth of penetration on the dial. The dial is graduated into 360 subdivisions, each representing 0.1 mm. of penetration. Supplied with A.S.T.M. grease consistometer needle, but without stopwatch. **Each, $75.00**

CENTRIFUGE, see No. 5-335, page 170.

CENTRIFUGE TUBES, for determining water precipitation number, etc., in Petroleum Products, according to *A.S.T.M. Standard Methods for 1924, Serial Designations, D 91-21 T and D 96-24,* see No. 5-605 to No. 5-620, page 182.

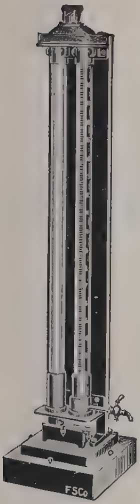
13-403. **CORROSION TEST DISH, Copper.** This dish is used in Test 530.1 as described in *U. S. Bureau of Mines, Technical Papers 323 and 323A.* It is of spun copper, approximately 3½ inches diameter, with a highly polished inner surface. **Each, $ .75**

13-405. **CLOUD AND POUR TEST APPARATUS,** for the cold test of oils. This apparatus is designed according to the A.S.T.M. Specifications, as described in *A.S.T.M. Standard Methods for 1924, Serial Designation D 97-23 T.* The apparatus consists of a double walled cooling chamber into which is lowered the bottle rack containing the oils to be tested. Four tests can be made simultaneously. All metal parts are protected from corrosion. Apparatus is supplied complete with four jars, five A.S.T.M. Thermometers, and directions for use. **Each, $37.00**

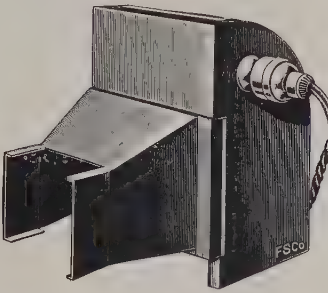
13-410. **THERMOMETER,** for No. 13-405 Cloud and Pour Test Apparatus. This thermometer is designed according to the A.S.T.M. Specifications, is 8¾ inches long, and is graduated from minus 36 to plus 120° F., in 2° divisions, calibrated for a 4¼ inch immersion. **Each, $3.00**

13-415. **JAR, Cooling, Glass;** for No. 13-405 Cloud and Pour Test Apparatus; without corks........**Each, $ .40**

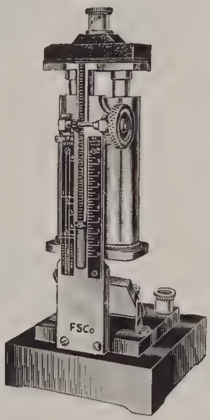
COLORIMETERS FOR PETROLEUM PRODUCTS



13-420



13-435



13-440

13-420. CHROMOMETER, Saybolt, Oil; for measuring the color of refined petroleum oils (naphthas, kerosenes, etc.) according to the *U. S. Committee of Standardization Petroleum Specifications, August, 1922. Bureau of Mines Technical Paper 323, 31 (1923).*

This colorimeter determines the color of a refined oil by matching in a single prismatic eyepiece, the color of a standard glass with the color of the unknown oil, by varying the depth of the oil contained in a comparison tube. The depth of oil under observation is regulated by means of a draw-off cock at the bottom of the tube. The comparison tube is 20 inches long, graduated in ¼ inches. A pair of glass color standards is supplied; these are identical and can be used singly, or both together, so that color shades below "standard white" and above "water white" can be determined. A special ½-color standard glass may be used to determine the color of gasolines of "high color,' giving this colorimeter a scale from below "standard white" through "water white" to the finer high grade "high color" gasolines.

Supplied complete with two glass color standards, wooden carrying case, with color table, and directions.

Each, $80.00

13-425. GLASS COLOR STANDARD, for use in No. 13-420 Chromometer. A single glass which can be interchanged with the standard glasses supplied with No. 13-420 Chromometer. **Each, $15.00**

13-430. ONE-HALF COLOR STANDARD, Special; for use in No. 13-420 Chromometer; for determining the color shade of gasoline of "high color," in Saybolt Universal Chromometer. This is a glass disc of just one-half of the color intensity of the standards supplied with the chromometer. It can be used separately or in conjunction with the standard glasses.

Each, $15.00

13-435. ILLUMINATOR, with Daylight Lamp; for No. 13-420 Chromometer and No. 13-440 Colorimeter. This illuminator has been designed especially for use in determining the color value of oils, and is generally used in making such tests.

The illumination is supplied by a standard Daylight lamp aided by reflection within the housing. This light is diffused by a Daylight glass screen. The housing of the lamp is designed to fit the colorimeter so as to exclude all extraneous light, thus guaranteeing a uniform unchanging source of illumination.

Each, $15.00

13-440. COLORIMETER, Robinson, with N.P.A. Color Scale; for the precise determination of the color shades of Lubricating Oils.

This colorimeter is of the same general type as No. 13-420 Chromometer, but combines with it the advantages of the Duboscq Plunger-Type Colorimeter. The color of the standard glass is matched by varying the depth of oil under observation; this is done by elevating or lowering an immersion tube by means of a rack and pinion. The depth of oil is measured on a scale on the front of the instrument.

Three standard color glasses, representing the true colors of the oil, are mounted in protecting caps screwed on to the standard color tube. There are two scales mounted on the front of the instrument; one is the N.P.A. color scale; the other is the Robinson color scale. This is particularly convenient where oils are bought and sold under different color specifications.

Supplied complete with 3 standard color glasses, wooden carrying case, color table, and directions.

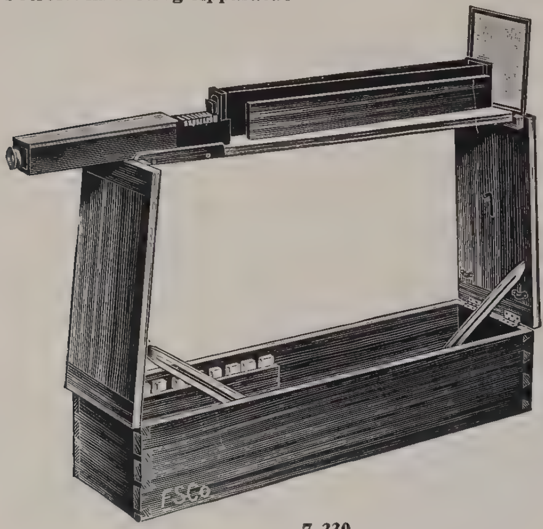
Each, $100.00

ILLUMINATOR, for No. 13-440 Colorimeter, see No. 13-435.

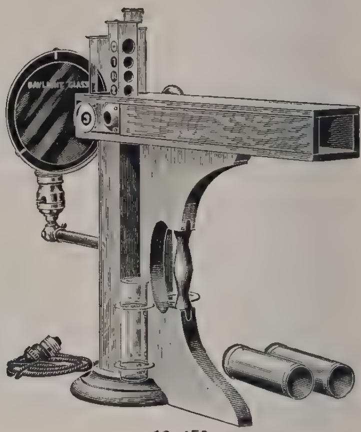
13-445. GLASS COLOR STANDARDS, for use with No. 13-440 Colorimeter. Listed under this number for replacement of those supplied with the No. 13-440 Colorimeter.

Standard No.	1	2	3
Each	$12.50	12.50	12.50

Petroleum Testing Apparatus



7-330
See also No. 7-335



13-450

7-330. COLORIMETER, Lovibond Tintometer Outfit, for Light-colored Petroleum Products. This Tintometer has been the standard used in petroleum refineries for many years and has proven a simple means by which they have graded gasoline, kerosene, etc. The instrument shows the depth of color in the liquids and this can be accurately measured in degrees, by comparing the unknown with the standards, which are Lovibond Standard Color Glasses.

This Tintometer is monocular and is equipped with one 18-inch, silvered Metal Trough, with parallel plate-glass ends. The wooden case which contains the instrument and accessories, when opened, forms the support upon which the Tintometer rests. The observation is made against a special milk-white glass reflector. Four Lovibond Standard Color Glasses are supplied as follows: Water White, Standard White, Superfine White and Prime White. Furnished complete, in wooden case, with standards. **Each, $75.00**

7-335. COLOR STANDARD SET, for Intermediate Oils. This set consists of five Compound Lovibond Standard Color Glasses as follows: N. P. A. Standards. No. 1½, No. 3, No. 4, No. 5, and No.7. **Per set, $22.50**

13-450. COLORIMETER, Union; for the Measurement of Color of Lubricating Oils, etc. *Adopted by the National Petroleum Association, and as a Tentative Standard by the American Society for Testing Materials, Serial Designation D 153-23 T.*

The colorimeter consists essentially of a long horizontal tube through the end of which a magazine of eleven standard glasses is passed vertically. A bottle containing the sample of oil is placed in the pocket beside the color magazine. The magazine is moved upward or downward by means of a thumb screw, until the unknown color is matched with a standard glass, and the number of this glass is observed in the mirror on the side. These glasses are graded and numbered according to the A.S.T.M. standards which are also the N.P.A. standards.

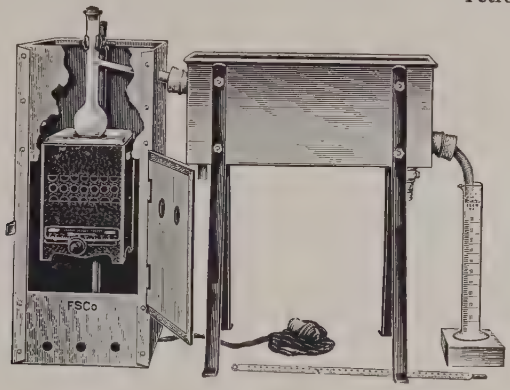
This one instrument can be used for colorimetric measurements, and for converting colorimetric values established in one system, directly into values in either of the other two standard systems of color measurement, as follows:

				Lovibond Analysis		
A.S.T.M. Color Numbers	Alphabetical Designations	N.P.A. Color Numbers	N.P.A. Names	Red 200 Series	Yellow 510 Series	Blue 1180 Series
1	G	No. 1 N.P.A.	Lily White	0.12	2.4	....
1½	H	No. 1½ N.P.A.	Cream White	0.60	8.0	....
2	I	No. 2 N.P.A.	Extra Pale	2.5	26.0	....
2½	J	No. 2½ N.P.A.	Ex. Lemon Pale	4.6	27.0	....
3	K	No. 3 N.P.A.	Lemon Pale	6.9	32.0	....
3½	L	No. 3½ N.P.A.	Ex. Orange Pale	9.4	45.0	....
4	M	No. 4 N.P.A.	Orange Pale	14.0	50.0	0.55
4½	N	No. 4½ N.P.A.	Pale	21.0	56.0	0.55
5	O	No. 5 N.P.A.	Light Red	35.0	93.0	....
6	P	No. 6 N.P.A.	Dark Red	60.0	60.0	0.55
7	Q	No. 7 N.P.A.	Claret Red	60.0	106.0	1.8
8	R	No. 8 N.P.A.	Ex. Dark Red	166.0	64.0	....
A	A	A Cylinder Oil	Ex. Light Filtered	10.2	29.0	....
D	D	D Cylinder Oil	Light Filtered	21.0	31.0	....
E	E	E Cylinder Oil	Medium Filtered	89.0	56.0	....

Illumination for the colorimeter is obtained from the 50-watt lamp with a Daylight filter; this is mounted at the rear of the colorimeter. The light is diffused by a white glass screen at the rear of the observation tube.

Two standard jars are supplied; one can be filled with a known standard and the other with the unknown, and comparison made through the colorimeter in line with the blank aperture in the magazine.

The entire apparatus is of very substantial construction, and is mounted on a broad base to give it stability. It is supplied complete with a standard 4-ounce sample bottle; two standard referee's jars; set of eleven color standards mounted in the magazine; two metal bottle covers for excluding stray light from bottles during observation; a 50-watt Daylight lamp; cord and plug ready to connect directly to the standard 110-volt current. **Each, $165.00**



13-455
See also No. 13-460
(A. S. T. M. Distillation Thermometers are listed on page 490)

13-455. GASOLINE DISTILLATION APPARATUS, A.S.T.M., Electric; for the distillation of gasoline and similar light oils according to *A.S.T.M. Standard Methods for 1924, Serial Designation D 86-24 T*. This apparatus consists of a standard Engler flask, iron flask support, flask shield, electric heater, special A.S.T.M. Gasoline Thermometer, special tin lined copper condenser, and a glass receiver.

Flask. The flask is a standard Engler distilling flask of Pyrex glass, 100 ml. capacity; diameter of bulb, 65 mm.; length of neck, 150 mm.; diameter of neck, 16 mm.; length of vapor tube, 100 mm. The vapor tube is sealed to the neck at an angle of 75 degrees to the vertical, and at such a height that, when the flask contains 100 ml. of liquid, the surface of the liquid is 90 mm. below the bottom of the junction of the side tube and neck.

Flask Support. The support has a cast-metal base with an iron supporting rod screwed into it. The rod carries an adjustable clamp for the flask and takes the clamp of the electric heater.

Flask Shield. The shield is made of 22 gauge, galvanized sheet iron about 48 cm. (19 inches) high by 28 cm. (11 inches) long and 20 cm. (8 inches) wide, with a hinged door in one of the narrow sides.

Electric Heater. The heater has a replaceable heating element of "Chromel A" wire, wound across a high temperature refractory. Above the coil is an asbestos block with a central hole 31.75 mm. (1¼ inches) in diameter. The rheostat is mounted below the refractory and is operated through a rack and pinion actuated by a knob at the front of the heater. The knob moves across a graduated scale so that the heater can be reset at any predetermined temperature. The heater has a sheet-iron housing which is finished in black crystallized lacquer, and has a clamp for fastening it on the support rod. The heater is supplied with a cord and plug for connecting it to an electric light socket.

Thermometer. The thermometer is an A.S.T.M. Low Distillation Thermometer with etched stem, nitrogen filled and calibrated for total immersion; range, zero to 300° C. in 1° subdivisions, total length, 380 mm. (15 inches).

Condenser. The condenser has a 14.29 mm. brass tube, about 560 mm. long with the lower end curved to fit into the receiver. It is surrounded by a cooling jacket, approximately 380 mm. (15 inches) long, by 100 mm. (4 inches) wide, by 150 mm. (6 inches) deep, which has a water inlet at the bottom and a constant-level overflow tube near the top. The jacket is made of heavy copper, tinned on the inside, and is supported by iron legs. **Receiver.** The receiver is a standard 100 ml. glass cylinder, made according to the A.S.T.M. specifications, D 86-24 T.

Complete apparatus as described, for use on either 110 or 220 volt current. **State current when ordering.**

A. For 110 volt current, **Each, $43.00**
B. For 220 volt current, **Each, $43.00**

If so specified, No. 13-455 Apparatus will be supplied with a No. 13-480 Fahrenheit Thermometer instead of the Centigrade Thermometer.

SPARE PARTS, for electric heater, see No. 11-435 to No. 11-460.

13-460. GASOLINE DISTILLATION APPARATUS, A.S.T.M., Gas Heated; for the distillation of gasoline and similar light oils according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 86-24 T*. This apparatus is similar to the No. 13-455, but is supplied with a Pittsburgh Universal gas burner instead of the electric heater. It has a ring support for the flask, and a clamp for supporting the burner. Complete with A.S.T.M. 300° C. thermometer and rubber tubing for connecting the burner. **Each, $30.00**

No. 13-460 Apparatus when equipped with No. 13-465 Asbestos Flask Rest with 1½-inch hole, and High Distillation Thermometer No. 6-955 or No. 13-485, can be used for the distillation of kerosene and similar higher boiling-point oils.

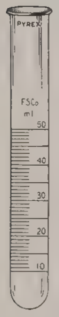
10-145. FLASKS, Engler, for No. 13-455 and No. 13-460 Distillation Apparatus. .... **Each, $ .60**
Case lots of 54, 10% discount.

13-465. ASBESTOS FLASK REST, with 1½-inch opening; used with No. 13-460 Apparatus when distilling **kerosene.** **Each, $1.00**

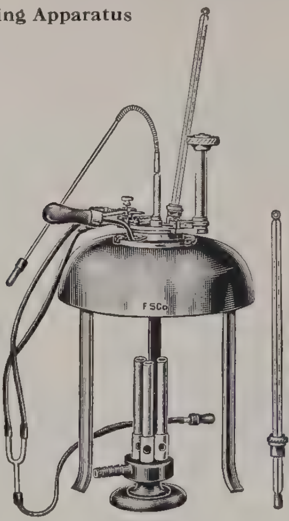
13-470. CONDENSING TROUGH, A.S.T.M.; for distillation of gasoline, naphtha, kerosene, turpentine, and similar liquids. As described with the No. 13-455 Apparatus. **Each, $13.00**

13-475. RECEIVER, A.S.T.M.; for No. 13-455 and No. 13-460 Apparatus. Glass graduated cylinder; 100 ml. capacity; made according to A.S.T.M. specifications, D 86-24T. **Each, $1.00**

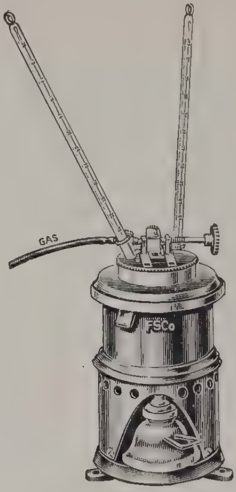
Petroleum Testing Apparatus



13-490



13-495



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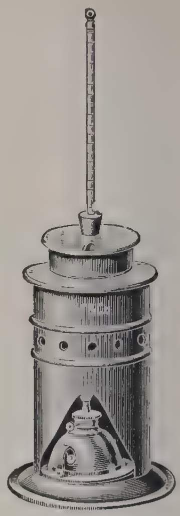


13-515

1-590. THERMOMETER, A.S.T.M., Low Distillation, Centigrade. Range, zero to 300° C., subdivided in one (1) degree divisions; nitrogen filled; calibrated for total immersion; length, 380 mm. The thermometer complies with the specifications set forth in *A.S.T.M. Standard Methods for 1924, Serial Designation D 86-24 T.* **Each, $5.00**

13-480. THERMOMETER, A.S.T.M., Low Distillation, Fahrenheit. Range, 30° to 580° F., subdivided in two (2) degree divisions. All other specifications are the same as No. 1-590. **Each, $5.00**

6-955. THERMOMETER, A.S.T.M., High Distillation, Centigrade. Range, zero to 400° C., subdivided in one (1) degree divisions; nitrogen filled; calibrated for total immersion; length, 380 mm. The thermometer complies with the specifications set forth in *A.S.T.M. Standard Methods for 1924, Serial Designation D 86-24 T.* **Each, $6.00**

13-485. THERMOMETER, A.S.T.M., High Distillation, Fahrenheit. Range, 30° to 760° F., subdivided in two (2) degree divisions. All other specifications are the same as No. 6-955. **Each, $6.00**

WASH OIL DISTILLATION APPARATUS, see Pages 226 and 227.

13-490. EMULSION TUBE, Pyrex Glass; for the determination of the resistance of lubricating oils to steam emulsification, as described in *A.S.T.M. Standard Methods for 1924, Serial Designation D 157-23 T.* This tube is made of Pyrex glass, 25 mm. diameter by 200 mm. long, graduated from 10 to 50 ml. in 1 ml. subdivisions, with every fifth subdivision extending entirely around the tube. **Each, $2.75**

13-495. FLASH POINT TESTER, Pensky-Martins, Closed; for the determination of the flash and fire tests of both light and heavy oils, bituminous materials, etc., according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 93-22, and U. S. Bureau of Mines, Technical Papers 323 and 323A.* This apparatus consists of a central oil cup surrounded by an air bath and heated by means of a triple Bunsen burner. The oil in the cup is agitated by a propeller supported by the cover. The cover has four openings for the thermometer, stirrer, flame, and vent, and supports the flame-tilting device. Supplied with burner, a low-range thermometer, 20° to 230° F., and a high-range thermometer, 200° to 700° F. **Each, $85.00**

13-500. THERMOMETER, A.S.T.M., Low Range, P.M., Fahrenheit; for use with No. 13-495 and No. 13-510 Flash Point Testers; length, 275 mm., graduated from 20° to 230° F. in 1° F.; calibrated for 2¼ inch immersion. **Each, $4.25**

13-505. THERMOMETER, A.S.T.M., High Range, P.M., Fahrenheit; for use with No. 13-495 and No. 13-510 Flash Point Testers; length, 275 mm., graduated from 200° to 700° F. in 5° divisions; calibrated for 2¼ inch immersion. **Each, $5.50**

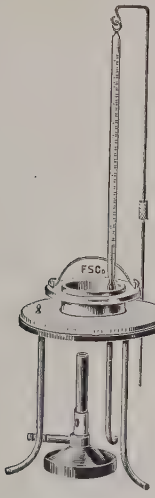
13-510. FLASH POINT TESTER, A.S.T.M., Closed; for determining the flash point of volatile flammable liquids according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 56-24, and U. S. Bureau of Mines, Technical Papers 323 and 323A.* Adopted by the National Paint, Oil and Varnish Association, National Varnish Manufacturers Association, and Paint Manufacturers Association. This apparatus has the oil cup surrounded by a water bath. The pilot flame-tilting device is mounted directly on the cover of the cup. The apparatus is supplied with a thermometer, 275 mm. long, graduated for 20° to 230° F. in 1° subdivisions, and calibrated for 2¼ inch immersion. **Each, $55.00**

THERMOMETERS, for No. 13-510 Apparatus, see No. 13-500 and No. 13-505.

13-515. FLASH POINT TESTER, Elliott, Closed Type. Adopted by the New York Board of Health for determining the flash and fire points of oils, asphalts, etc., as described in *Abraham's "Asphalts and Allied Substances," 519, 1918.* The tester has a 300 ml. copper cup, heated in an oil bath by means of an alcohol lamp. The cover is of glass, has a hole for the thermometer, and one for inserting the test flame. Complete with lamp and thermometer. **Each, $14.00**

13-520. THERMOMETER, for use in No. 13-515 Elliott Flash Point Tester. This thermometer is about 14 inches long, and is graduated from minus 10° to plus 360° C., in 1° divisions. **Each, $1.75**

13-525. GLASS PLATES, for use in No. 13-515 Elliott Flash Point Tester. This plate is ⅛ inch thick, and has holes drilled to accommodate the thermometer and the test flame. **Each, $1.50**



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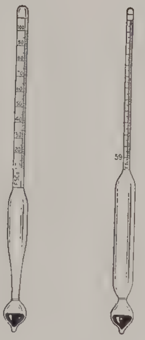

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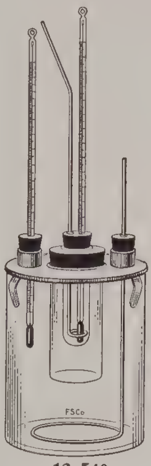


13-540

13-530. FLASH POINT TESTER, Cleveland, Open Type; for determining the Flash and Fire Points of oils according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 92-24.* The apparatus has a brass cup, 63 mm. inside diameter, supported on an iron tripod support. An asbestos board, with a hole in its center, covers the top of the support and limits the heating area. The thermometer is 12 inches long, graduated from 20° to 760° F. in 5° subdivisions, calibrated for one (1) inch immersion. This is suspended from an adjustable rod attached to the tripod. Supplied with thermometer and burner. **Each, $18.50**

13-535. OIL FLASH POINT THERMOMETER, A.S.T.M., Fahrenheit; for No. 13-530 Cleveland Flash Point Tester, 12 inches long, graduated from 20° to 760° F. in 5° subdivisions; calibrated for one (1) inch immersion. **Each, $5.50**

11-603. HYDROMETERS, Petroleum, A. P. I. Based on the modulus of 141.5; recommended by the American Petroleum Institute and accepted by the U. S. Bureau of Standards and U. S. Bureau of Mines. The relation of Degrees A. P. I. to Degrees Specific Gravity, is expressed by the formula:

$$\text{Degrees A. P. I.} = \frac{141.5-131.5}{\text{Sp. Gr.}}$$

(Sp. Gr. is the specific gravity of the oil at 60° F. referred to water at 60° F.)

These hydrometers are glass, weighted with mercury, and are about 12 inches long. Hydrometer A is graduated in 1° subdivisions, while all the other hydrometers, **B** to **K** inclusive, are graduated in 0.1° subdivisions.

Hydrometer	A	B	C	D	E
Scale, Minimum, Degrees	10	10	19	29	39
Scale, Maximum, Degrees	100	21	31	41	51
Each	**$2.50**	**2.75**	**2.75**	**2.75**	**2.75**
Hydrometer	F	G	H	J	K
Scale, Minimum, Degrees	49	59	69	79	89
Scale, Maximum, Degrees	61	71	81	91	100
Each	**$2.75**	**2.75**	**2.75**	**2.75**	**2.75**

13-540. PARAFFIN MELTING POINT APPARATUS, for the determination of the melting point of paraffin wax according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 87-22.* The wax container is a test tube 25 mm. in diameter by 100 mm. long, with a filling mark 50 mm. above the bottom, and fitted with a stopper which has one hole to receive the thermometer and another lined with glass tubing to serve as a guide for the wax stirrer. The air bath is also of glass 50 mm. by 115 mm., and is also closed by a stopper. The water bath is of glass 125 mm. by 150 mm., and is closed by a nickel-plated brass cover with openings to receive a stopper carrying the bath thermometer, and to receive the bath stirrer. An A.S.T.M. Paraffin Melting Point Thermometer for the wax, and a thermometer for the bath are also supplied.

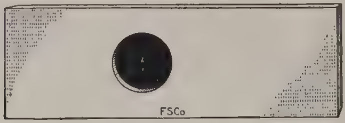
Complete apparatus, as described. **Each, $22.00**

13-545. PARAFFIN MELTING POINT TEST TUBE, for No. 13-540 Apparatus. Length, 100 mm.; diameter, 25 mm., with filling mark, 50 mm. above the bottom. This tube can also be used for determining the melting point of petrolatum according to *A.S.T.M. Standard Methods for 1924, Serial Designation D 127-24 T.* **Each, $ .90**

13-550. PARAFFIN MELTING POINT THERMOMETER, A.S.T.M. To measure the temperature of the wax in No. 13-540 Apparatus; etched stem, glass, nitrogen filled, about 370 mm., range, 80° to 160° F., graduated in 0.2 divisions, calibrated for 79 mm. immersion. **Each, $6.00**

13-555. BATH THERMOMETER. Used in the water bath in No. 13-540 Apparatus. Etched stem; 220° F. in 2° F. divisions. **Each, $1.75**

Petroleum Testing Apparatus



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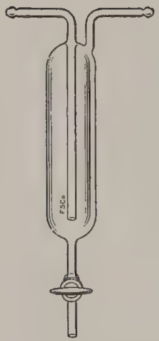

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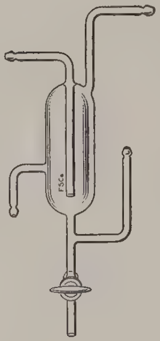

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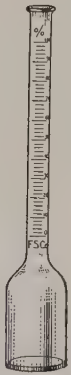
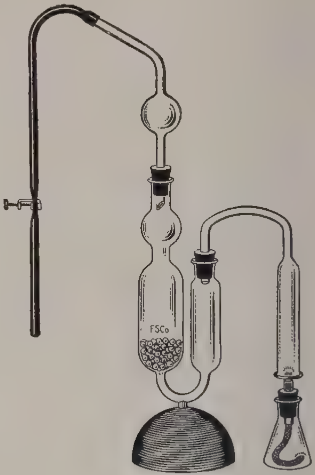


6-904



13-560

SEDIMENT EXTRACTION APPARATUS, for the determination of sediment in oils, see No. 9-585.

13-556. SLIDE, Micro Fossil; for mounting fossils for microscopic examination. The history of the fossil can be logged and the horizon, date and location of find written directly on the slide. These slides are used in general geological work as well as for logging oil, gas and water wells.

The slides are made of white, glazed cardboard, 3 x 1 inches, with a circular concavity 1 mm. deep. The concavity has a black background, against which the fossils appear in marked contrast. A piece of transparent paper or celluloid can be pasted over the concavity and the slide, with its specimen, becomes a permanent record. **Per box** (100 slides) **$2.00**
Per carton (1000 slides) **$15.00**

13-557. STILL TRAP, Petroleum, Young; for demonstrating the vapor-liquid equilibrium at any one stage of a distillation. This trap affords a means of studying the rectification of alcohol and the distillation and "cracking" of crude oils for gasoline, etc.

A number of these glass traps are connected in series to the outlet of the still. As the distillation progresses, the distillate is condensed successively in each of the traps, forming a liquid seal. This liquid soon comes to equilibrium with the vapor above it and, when the distillation is interrupted, the contents of each trap represent a state of equilibrium at that particular moment. Analysis of the contents gives an idea of the change in concentration of vapor with successive distillations and partial condensation.

The bulb of the trap is about 5 inches long and 1½ inches diameter, with glass stopcock for draining. Length over all, 10 inches. **Each, $3.25**

13-558. STILL TRAP, with Reflux, Young; similar to No. 13-557 and used for studying the effect of reflux on the vapor-liquid equilibrium during distillation. As the distillation progresses, the composition of the liquid in the traps is regulated by the rate of reflux.

The bulb of the trap is about 4 inches long and 1½ inches diameter, with a glass stopcock for draining. Length over all, 10 inches. **Each, $4.00**

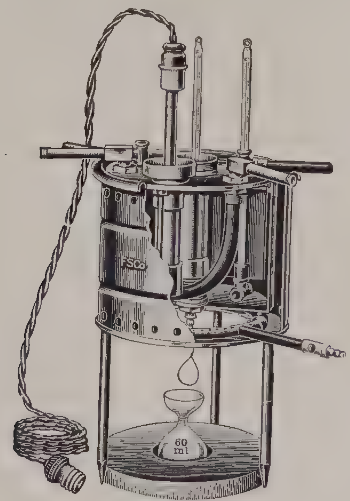
6-904. SULPHONATION BOTTLE, for determining the quantity of unsulphonated material (paraffines) in a light oil by the Babcock method. This bottle is made according to the *Specifications of the U. S. Federal Specifications Board for Testing Petroleum, "Technical Paper 323, Method 550.1,"* and is recommended for use in tests like E 8 of the Barrett Company. (*See Journal of Industrial and Engineering Chemistry, X, 1006, December, 1918.*) This is a modified Babcock bottle with the neck capacity of 10 ml., graduated from zero to 100% in 2% divisions. This design permits the use of about four times the quantity of oil permitted in the ordinary Babcock bottles, making the test just that much more accurate. It has the additional advantage of having the percentage of paraffines indicated directly on the scale, thereby eliminating all calculations. **Each, $ .85**

CENTRIFUGE, for swinging No. 6-904 Bottle, see No. 5-110 and No. 5-335.

13-560. SULPHUR DETERMINATION APPARATUS, for determining the sulphur content of naphthas and illuminating oils, according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 90-24 T.* The apparatus has a glass oil lamp, chimney, absorbing pipette with glass beads, and a spray trap; capacity of lamp about 25 ml.; capacity of absorbing pipette, 150 ml. Supplied complete with cork stoppers, wooden base, 2 feet of rubber tubing, and a screw clamp for the tubing. **Each, $4.75**

SULPHUR DETERMINATION APPARATUS, Oxygen Bomb Method, see pages 128 to 132.
SULPHUR DETERMINATION APPARATUS, Peroxide Bomb Method, see No. 6-740, page 220.

For A. S. T. M. Thermometers, see No. 13-575



13-565
See also No. 13-570

13-572

13-565. VISCOSIMETER, Saybolt Universal, A.S.T.M., for the determination of viscosity of lubricants according to *A.S.T.M. Standard Methods for 1924, Serial Designation D 88-24 T.* This viscosimeter has also been adopted by the U. S. Government, the National Petroleum Association, and the American Petroleum Institute. The apparatus has an oil tube with an overflow cup at the top, surrounded by an oil bath. At the bottom of the tube is a small outlet, through which the oil to be tested flows into the receiving flask. The outlet tube is of hard, non-corroding metal, and is enclosed in a larger protecting tube which is stoppered by a cork. This mounting forms an air chamber below the outlet tube and prevents the flow of oil through it until the cork is removed and the test started. Heating is accomplished by means of either the ring gas burner mounted below the oil bath, the electric heater supplied with this apparatus, or by steam passed directly through the U-tube mounted in the oil bath. When using the electric heater, water should be run through the U-tube to control the temperature. Paddles are also provided for stirring the oil in the oil bath.

The viscosity is determined by measuring the time, in seconds, required for 60 ml. to flow through the oil tube.

The apparatus is supplied with electric heater, one (1) 60 ml. oil receiving flask, one (1) one-hundred mesh oil strainer and cup, one (1) oil pipette with aspirating bulb for draining the overflow cup before each test, and one (1) tube cleaner. Supplied without stopwatch. With 6 thermometers; 2 each, range 70 to 110° F., 100 to 140° F. and 180 to 220° F.; all divided in 1°.

A. For 110 volt current, **Each, $90.00**
B. For 220 volt current, **Each, $90.00**

13-570. VISCOSIMETER, Saybolt Furol, A.S.T.M., for the determination of the viscosity of heavy oils as road oils, fuel oils, lubricating oils, etc. This viscosimeter is similar to the No. 13-565 Saybolt Universal Viscosimeter, but has a larger orifice to accommodate the heavier oils. The equipment and accessories supplied are the same as No. 13-565, but with 2 thermometers, range 100 to 140° F.

A. For 110 volt current, **Each, $90.00**
B. For 220 volt current, **Each, $90.00**

13-572. STOPWATCH, Non-Magnetic, Jeweled Movement. A high grade watch for use with viscosimeters, and for timing other laboratory operations. With jeweled Swiss movement in nickel case. The split-second hand makes a complete revolution in 60 seconds, and the dial is divided in ⅕-second divisions. Another hand records up to 30 minutes in one complete revolution. The split-second hand is started, stopped, and returned to zero by pressing the stem. **Each, $13.50**

13-575. THERMOMETERS, A.S.T.M., for use with No. 13-565 and No. 13-570 Viscosimeters. These thermometers are 10 inches long, are nitrogen filled, and are made to the specifications of the American Society for Testing Materials, *Standard Methods for 1924, Serial Designation D 88-24 T.*

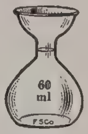
Two thermometers of the same range are used in making the test, one for the bath, the other for the oil.

	FAHRENHEIT			
Thermometer	A	B	C	D
Range, degrees F	66 to 80	94 to 108	120 to 134	204 to 218
Subdivisions, degrees	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
For tests at, degrees F	77	100	122, 130	210
Each	**$5.00**	**5.00**	**5.00**	**5.00**

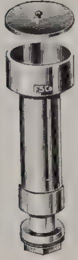
	CENTIGRADE			
Thermometer	E	F	G	H
Range, degrees C	19 to 27	34 to 42	49 to 57	95 to 103
Subdivisions, degrees	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
For tests at, degrees C	25	40	50	00
Each	**$5.00**	**5.00**	**5.00**	**5.00**

Flasks, Heater and Pipette for Saybolt Viscosimeter are listed on page 494.

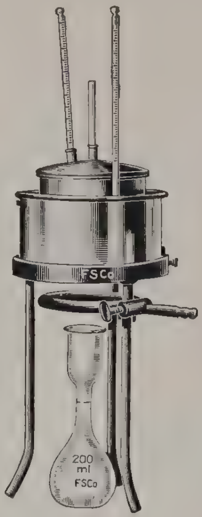
Petroleum Testing Apparatus



10-230
See also No. 10-235



13-590



13-595
See also No. 13-596

10-230. **VISCOSIMETER FLASK, Resistance Glass;** for No. 13-565 Saybolt Universal, and No. 13-570 Saybolt Furol Viscosimeters. Graduated at 60 ml., with constricted neck and enlarged mouth. **Each, $1.00**

10-235. **VISCOSIMETER FLASK, Pyrex Glass;** for No. 13-565 Saybolt Universal, and No. 13-570 Saybolt Furol Viscosimeters. Graduated at 60 ml. **Each, $1.25**

13-580. **VISCOSIMETER HEATER, Electric;** for No. 13-565 Saybolt Universal, and No. 13-570 Saybolt Furol Viscosimeters. This heater is supplied with cord, snapswitch, and plug for direct connection to a lighting socket, draws 500 watts, and is inserted directly into the oil or water in the bath of the viscosimeter. **State voltage when ordering.**

A. For 110 volt current, **Each, $9.00**
B. For 220 volt current, **Each, $9.00**

13-585. **VISCOSIMETER PIPETTE,** for use with No. 13-565 Saybolt Universal and No. 13-570 Saybolt Furol Viscosimeter, consisting of a glass pipette with rubber aspirating bulb. **Each, $1.00**

13-590. **VISCOSIMETER TUBE, Universal and Furol combined;** for the determination of the viscosity of both light and heavy oils according to the *A.S.T.M. Standard Methods for 1924, Serial Designation D 88-24 T.* This tube is supplied with two interchangeable orifices· the "Universal" for light oils and the "Furol" for lubricating oils which permit the entire range of viscosity of oils to be determined in a single tube. The tube is made from solid metal so as to eliminate all warping and leaking of joints. The orifices are made of special stainless steel of specified hardness, which is well above the A.S.T.M. requirements. As this tube has outside dimensions which approximate those of the "Saybolt" type, it can be used in any bath which will accommodate Saybolt tubes.

Viscosimeter Tube, with two orifices. **Each, $55.00**

13-595. **VISCOSIMETER, Engler;** for the determination of the viscosities of both low and high viscosity oils, bituminous substances, etc. This is a standard instrument for accurate determinations. The oil cup has a gold lining and a platinum outflow tube, calibrated to deliver 200 ml. of water in 50 to 52 seconds. The oil jacket is wide to permit ample mixing of the bath liquid. The cover has a double wall with an air space between, to lessen radiation.

Apparatus is supplied with an iron tripod support; a glass receiving flask for the oil, of 200 ml. capacity; two etched-stem thermometers, one for low temperature determinations, range, 10° to 50° C. in 1° subdivisions, and one for high temperature determinations, range, 10° to 150° in 1° subdivisions; and a gas burner to be attached directly to the tripod support. **Each, $70.00**

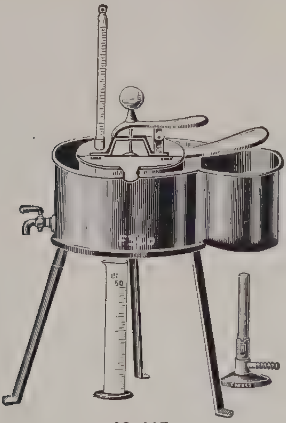
13-596. **VISCOSIMETER, Engler, with Stirring Device.** This instrument is similar to No. 13-595 in that the oil receptacle is gold plated and the outlet tube is of platinum. The inset cover is double walled and rests upon a flange, the level of which is covered by the liquid in the outer bath. The outer bath is somewhat larger than that of the No. 13-595 Viscosimeter and is provided with a stirring device, which operates a metal blade underneath the oil receptacle and maintains a more constant temperature.

Supplied complete with tripod support, receiving flask, two (2) etched stem thermometers and a ring gas-burner to be attached to the tripod support. **Each, $80.00**

13-600. **RECEIVING FLASK,** for No. 13-595 Viscosimeter. Graduated at 200 ml., with enlarged top. **Each, $1.00**

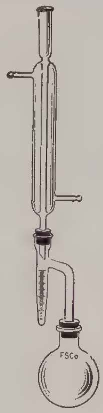
13-605. **VISCOSIMETER THERMOMETER, Low Temperature;** for use with No. 13-595 Engler Viscosimeter, graduated 10° to 50° C. in 1° subdivisions. Etched stem thermometer, with brass collar to fit the opening in the viscosimeter. **Each, $4.50**

13-610. **VISCOSIMETER THERMOMETER, High Temperature;** for use with No. 13-595 Engler Viscosimeter, graduated 10° to 150° C. in 1° subdivisions. Etched stem thermometer, with brass collar to fit the opening in the viscosimeter. **Each, $5.50**



13-615

13-620



13-630

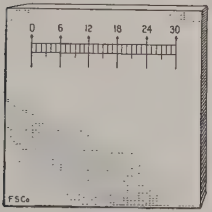
13-615. VISCOSIMETER, Scott; for determining the viscosity of oils. This is a simple and inexpensive instrument for use where extreme accuracy is not required. It has a brass oil cup surrounded by a water-jacket which is heated by a Bunsen burner. The cover of the oil cup is provided with a metal bushing for receiving the thermometer, and a weighted arm attached to a plunger which closes the outlet at the bottom. The outer jacket is fitted with a brass drain cock. Each instrument is calibrated for the time of efflux of 50 ml. of water, and has the time in seconds stamped on the weighted arm.

Apparatus is supplied with an iron tripod support, a graduated glass cylinder of 50 ml. capacity, a thermometer graduated to 220° F. in 1° F. divisions, and a Forbes-Bunsen burner. **Each, $25.00**

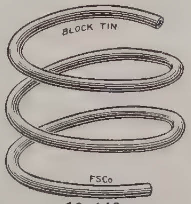
13-620. VISCOSITY PIPETTE, Dudley. This pipette is about 24 inches long, and is made and calibrated to deliver 100 ml. of water at 60° F. in 30 to 32 seconds. The exact time of delivery of each pipette should be determined by the operator. The outlet tip is a tube of uniform diameter, and is ground to a flat end so that the rate of discharge will be constant. **Each, $3.00**

13-630. WATER DETERMINATION APPARATUS, for the determination of water in petroleum products and bituminous materials, according to *A.S.T.M. Standard Methods for 1924, Serial Designation D 95-24.* This apparatus consists of a round bottom, short-necked, Pyrex glass flask of 500 ml. capacity; a glass Liebig condenser with sealed jacket 400 mm. long, and with the outlet tube ground to a 60° angle; a glass trap graduated from zero to 10 ml. in 0.1 ml. subdivisions. This apparatus can be mounted with the usual laboratory supports. Glass parts only, as described. **Each, $4.50**

PHOSPHORUS TUBE, Goetz, see No. 5-625, page 182.
PHOSPHORUS TUBE, Jones Reductor, see Reductor Tube No. 13-940.



13-635



13-640

13-645

13-635. PILL TILES, Porcelain; glazed on one side, with graduations. These tiles are pure white, which makes an excellent background; they are hard glazed which makes them stainless. Size A has 24 equal graduations, numbered at every 6 graduations. Size B has 30 graduations, numbered at every 6 graduations. The lines and the numbers are dark blue, in contrast to the pure white plate. The material is rolled to the length corresponding to the number of portions into which it is to be divided. It is then quickly and accurately divided by cutting at the graduation marks.

Size	A	B
Dimensions, inches	8x8	10x10
Each	**$1.25**	**1.75**

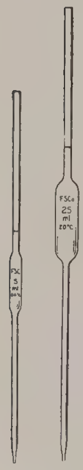
PINS, Insect, see Insect Pins No. 11-770, and No. 11-775, page 415.
PINNING FORCEPS, see Forceps No. 10-270, page 353.

13-640. PIPE, Pure Block Tin. Used for condensing coils, conducting distilled water and other liquids, etc.

Inside diameter, inches	¼	⅜	½	¾
Outside diameter, inches	.40	.52	.63	.90
Per foot	**$ .40**	**.55**	**.65**	**1.10**

13-645. PIPES, Clay, Smoking. When sealed with fire clay, they serve as inexpensive retorts for students' work. Sometimes fitted with one-hole corks and glass tips, and used as blowpipes. **Per dozen, $ .65**
Per gross, $5.25

PIPETTES



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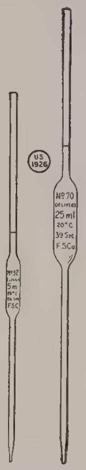
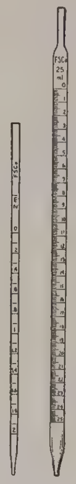
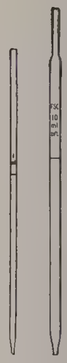


13-655

See also No. 13-660



13-665



13-670

13-650. PIPETTES, Transfer. With bulbs in the middle of the pipettes. The graduation mark on the upper tube, indicating the capacity, extends completely around the tube; the upper ends and the tips are fire-finished. The pipettes are calibrated "to deliver"; the unit of volume is the standard millileter (abbreviated ml.) adjusted to 20° C.

*Capacity, ml	1	2	5	10	20	25	50	100	200
Each	**$ .24**	**.24**	**.24**	**.37**	**.40**	**.40**	**.55**	**.80**	**1.15**

Dozen lots of a size, 10% discount.

13-655. PIPETTES, Transfer, Certified by the United States Bureau of Standards. Each one of these pipettes has been tested by the Bureau of Standards, and has been engraved with their official precision stamp, which signifies that it complies with their requirements as to size, time of delivery, accuracy of calibration, etc., as specified in *Circular No. 9 of the U. S. Bureau of Standards.* The accuracy of calibration of these pipettes is within the following limits of error.

1 and 2 ml	.006 ml.	25 ml	.03 ml.
5 ml	.01 ml.	50 ml	.05 ml.
10 ml	.02 ml.	100 ml	.08 ml.

The Bureau does not issue a certificate for pipettes, but engraves on them the "US" and the year.

Capacity, ml	1	2	5	10	25	50	100
Each	**$1.65**	**1.80**	**2.00**	**2.20**	**2.50**	**2.75**	**3.25**

13-660. PIPETTES, Transfer, Precision Quality, U. S. Bureau of Standards Specifications. These pipettes are made and calibrated according to the specifications in the Bureau of Standards' Circular No. 9, but have not been sent to the Bureau for certification. We believe that they comply with the requirements, but we cannot guarantee that each pipette will be certified by the Bureau.

We do not supply unofficial certificates, because of their "unofficial" nature they do not fulfill the requirements of a certificate. The Bureau of Standards official precision stamp on the No. 13-655 Pipettes, is the only recognized official certification.

Capacity, ml	1	2	5	10	25	50	100
Each	**$ .65**	**.70**	**.85**	**1.00**	**1.40**	**1.50**	**2.00**

13-665. PIPETTES, Measuring, Mohr type; calibrated "to deliver"; the unit of volume is the standard milliliter (abbreviated ml.) adjusted to 20° C.

Capacity, ml	$\frac{1}{10}$	1	1	2	5	10	25
Smallest subdivisions, ml	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each	**$ .36**	**.36**	**.32**	**.33**	**.33**	**.36**	**.55**

Dozen lots of a size, 10% discount.

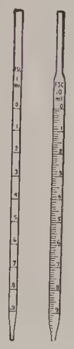
For volume measurements requiring the precision of Bureau of Standard tolerances, see Precision Burettes, page 110.

13-670. PIPETTES, Bacteriological, without bulbs; for use in bacteriological work, examination of water, etc. The graduation mark on the tube, indicating the capacity, extends completely around the tube; the ends and tips are fire-polished. The pipettes are calibrated "to deliver"; the unit of volume is the standard milliliter (abbreviated ml.) adjusted to 20° C.

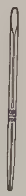
*Capacity, ml	1	5	10
Each	**$ .20**	**.20**	**.24**

Dozen lots of a size, 10% discount.

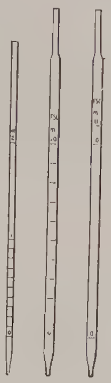
**Sizes recommended by the American Chemical Society, Standardization Committee.*



13-675



12-773



13-680

13-675. PIPETTES, Serological, graduated to extreme tip. Pipettes are calibrated to deliver the volume noted by blowing out the last drop; the volume is the standard millileter adjusted to 20° C.

*Capacity, ml	$\frac{1}{10}$	$\frac{2}{10}$	1	1	2	5	10
Smallest subdivisions, ml	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each	$ .36	.36	.36	.32	.34	.34	.36

Dozen lots of a size, 10% discount.

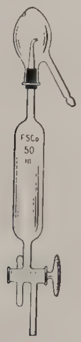
PIPETTE, Folin-Wu, see No. 6-520, page 211.
PIPETTES, Millard-Smith, see No. 6-525, page 211.

12-773. PIPETTE, Breed & Brew. Made of capillary glass tubing, without bulb, for use in preparing milk smears. For method, see *Technical Bulletin No. 49, N. Y. Agricultural Experiment Station, Geneva, New York.* Graduated to deliver 0.01 ml. of milk, Sp. Gr. 1.032, at 21° C. **Each, $1.00**

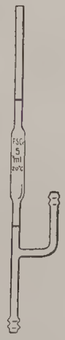
13-680. PIPETTES, Water Analysis, as used in the Hygienic Laboratory of the U. S. Public Health Service. The 2 ml. pipette is graduated from zero to 1 ml. in one-tenths, and with mark at 2 ml. point. The 10 ml. pipette is graduated from zero to 10 ml. in single milliliters. The 11 ml. pipette is graduated at the zero, 10 and 11 ml. points. These pipettes are calibrated "to deliver."

*Capacity, ml	2	10	11
Each	$ .50	.50	.50

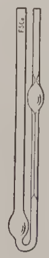
Dozen lots of a size, 10% discount



13-685



13-690



13-695

13-685. PIPETTES, Automatic Measuring, with overflow. With three-way stopcock and reservoir with outlet tube.

*Capacity, ml	10	25	50
Each	$3.20	3.80	4.00

13-690. PIPETTES, Calibrating, Ostwald; with two marks extending completely around the tube, indicating the capacity. The lower end and side tube are shaped for rubber tubing connections.

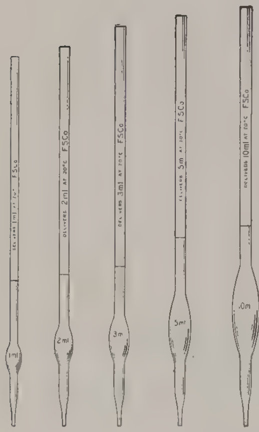
*Capacity, ml	2	5
Each	$1.00	1.20

13-695. PIPETTE, Viscosity, Ostwald; for the determination of the viscosity of liquids, according to the method of Poiseuille as described in *Findlay, "Practical Physical Chemistry," page 71, 1923.* Delivery time, 80 to 100 seconds. **Each, $1.50**

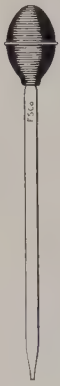
PIPETTE, Viscosity, Dudley, see No. 13-620, page 495.

**Sizes recommended by the American Chemical Society, Standardization Committee.*

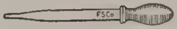
Pipettes



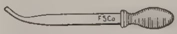
6-530



13-710



13-700



13-705

13-712

3-465

3-475

See also No. 3-470 and No. 3-480.

6-530. PIPETTES, Ostwald-Folin; accurately graduated to deliver the total volume by blowing out the last drop. The whole pipette is made of heavy capillary tubing, and tips are carefully fire-polished. This method of finishing the tips reduces the risk of chipping during sterilization. The pipettes are suitable for use in biochemistry, and are recommended in the newer methods of blood and urine analysis.

To deliver, ml	1	2	3	5	10
Each	**$ .50**	**.55**	**.60**	**.65**	**.70**

13-700. PIPETTES, Straight, "Medicine Droppers"; with rubber bulb, over all length, about 4 inches, capacity, about 2 ml. Packed one (1) dozen in a carton.* **Per dozen, $ .35**
Gross lots, 10% discount

13-705. PIPETTES, Curved, "Medicine Droppers." These are the same as No. 13-700, except that tips are curved.* **Per dozen, $ .35**
Gross lots, 10% discount

13-710. PIPETTES, Dropping; straight tube with rubber bulb, of about 30 ml. capacity.

*Length of glass tube, inches	8	12
Each	**$ .45**	**.50**

3-465. PIPETTE BOX, Sterilizing, Round, Copper; used for sterilizing pipettes and other glass tubes. Made of polished copper, 2 inches diameter and 16 inches high over all, to accommodate the recently standardized Bacteriological Pipettes. The covers are about one-third the height, permitting the pipettes to be more easily removed, because they extend above the body of the box when the cover is removed. **Each, $3.00**

3-470. PIPETTE BOX, Sterilizing, Round, Sheet Iron; similar to No. 3-465, but made of sheet iron, lacquered black. **Each, $1.75**

3-475. PIPETTE BOX, Sterilizing, Rectangular, Copper; used for sterilizing pipettes and other glass tubes. Made of polished copper 2½ x 1¾ inches, and 16 inches over all, to accommodate the recently standardized Bacteriological Pipettes. The covers are about one-third of the height, permitting the pipettes to be more easily removed because they extend above the body of the box when the cover is removed. **Each, $3.75**

3-480. PIPETTE BOX, Sterilizing, Rectangular, Sheet Iron; similar to No. 3-475, but made of sheet iron, lacquered black. **Each, $2.25**

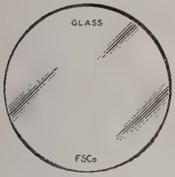
13-712. PITCHERS, Acid; suitable for transferring acids and other liquids from carboys.

Capacity gallons	½	1
Each	**$ .65**	**.80**

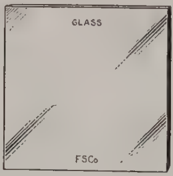
PLANT PHYSIOLOGY APPARATUS, see pages 76 to 79.

**Sizes recommended by the American Chemical Society, Standardization Committee.*

PLATES



13-715



13-720

13-725

13-730

13-735

13-715. PLATES, Glass, Circular, edges not ground. Useful for covering beakers, dishes, etc.

Diameter, inches	3	4	6
Each	$ .10	.12	.18

Dozen lots, 10% discount. **100 lots,** 20% discount

13-720. PLATES, Glass, Square, edges not ground. For covering jars, beakers, etc.

Size, inches	3x3	4x4	6x6
Each	$ .06	.10	.15

Dozen lots, 10% discount. **100 lots,** 20% discount

13-725. PLATES, Glass, Square; with one side ground, edges not ground. These plates are the same as No. 13-720 except that one side is ground.

Size, inches	3x3	4x4	6x6
Each	$ .15	.18	.24

Dozen lots, 10% discount. **100 lots,** 20% discount

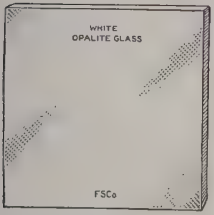
13-730. PLATES, Heavy Plate Glass, Square; ground on one side, edges not ground.

Size, inches	8x8	10x10	12x12
Thickness, inches	¼	¼	¼
Each	$ .70	1.00	1.40

13-735. PLATES, Blue Glass; so-called cobalt glass for observing the potassium flame.

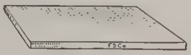
Size, inches	2x2	3x3	4x4
Each	$ .12	.15	.18

Dozen lots, 10% discount. **100 lots,** 20% discount

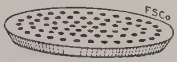


13-740

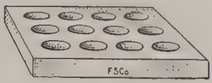
9-775



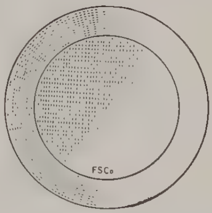
1-415



9-780



13-745



13-750

13-740. PLATES, Opalite; so-called "milk glass," square, with flat glazed surface on one side, edges not ground. Convenient for mixing purposes, etc.

Size, inches	4x4	6x6	8x8	12x12
Thickness, inches	⅛	⅛	¼	¼
Each	$ .25	.65	.90	1.50

9-775. PLATES, Filter, Alundum. Used in funnels for a large variety of filtrations, excepting those where strong alkalis are involved. They can be substituted for an asbestos mat; are easily cleaned by reverse washing and can be ignited. The edges are beveled at an angle of 60° to fit the usual funnel, and they can be packed tight with asbestos or they can be permanently cemented in funnel. They have a medium porosity, known as RA 225. *(Larger sizes can be supplied to order.)*

Diameter, mm	19	25	50
Thickness, mm	2	2	3
Each	$ .40	.40	.40

9-780. PLATES, Filter, Porcelain; top surface glazed, with 60 degree beveled edges, profusely perforated, for use as filter discs in funnels. The 22 mm. plate will fit Caldwell Crucible No. 8-225.

Diameter, mm	22	25	38	50
Each	$ .15	.15	.25	.30

Per dozen, 10% discount

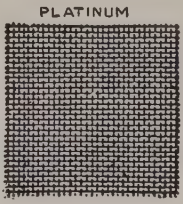
13-745. PLATES, 12 cavities, Porcelain; for color reactions. Glazed on top and sides; also used as a convenient receptacle for small weights. Length of plate, 110 mm.; width, 90 mm. **Each, $ .50**

13-750. PLATES, Porous; dinner-plate shape, of unglazed porcelain. Used for drying crystals and precipitates; outside diameter of top, 245 mm.* **Each, $ .30**
Dozen lots, 10% discount.

1-415. PLATE, Streak, of unglazed porcelain; used for arsenic tests and by mineralogists. Length, 100 mm.; width, 60 mm.; thickness, 4 mm.* **Each, $ .40**

**Sizes recommended by the American Chemical Society, Standardization Committee.*

13-755



13-760

13-765

REGARDING PLATINUM WARE

Platinum ware is sold by weight; the price per gram for each particular item, varies with the platinum market. Prices quoted are for immediate acceptance, otherwise subject to market fluctuations.

The various shapes are listed under their alphabetical classification in this catalogue.

PLATINUM COMBUSTION BOATS, see No. 7-668, page 255.
PLATINUM CONES, Filtering, see No. 9-765, page 331.
PLATINUM CRUCIBLES, see No. 8-030, page 267.
PLATINUM CRUCIBLES, Gooch, see No. 8-245, page 273.

PLATINUM DISHES, Evaporating, see No. 8-717 to No. 8-719, page 293.
PLATINUM ELECTRODES, see No. 9-280 to No. 9-305, page 315.
PLATINUM TRIANGLES, see No. 15-290, page 557.

13-755. PLATINUM FOIL.

Thickness, inches	.001	.002	.003
Approx. weight per sq. in., grams	0.353	0.705	1.058

Any other thickness can be furnished on short notice. **At market price.**

13-760. PLATINUM WIRE GAUZE.

Mesh	52	45
Diameter of wire, inches	.004	.0085
Approx. weight per sq. in., grams	.550	1.500

At market price.

13-765. PLATINUM WIRE.

B. & S. Gauge	14	16	18	20	22	24	25
Diameter, inches	.064	.051	.040	.032	.025	.020	.018
Approx. weight per ft., grams	13.62	8.65	5.36	3.4	2.08	1.33	1.08

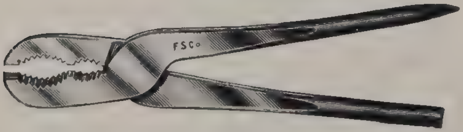
At market price.

B. & S. gauge	26	27	28	30	32	34	36
Diameter, inches	.016	.014	.012	.010	.008	.0063	.005
Approx. weight per ft., grams	0.85	0.65	0.48	0.33	0.213	0.15	0.086

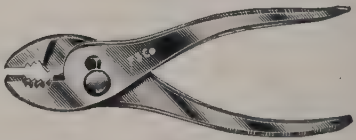
At market price.

13-770

13-775



13-780



13-785

13-770. PLIERS, Side Cutting, Flat Nose; polished steel face. Made of drop-forged steel.

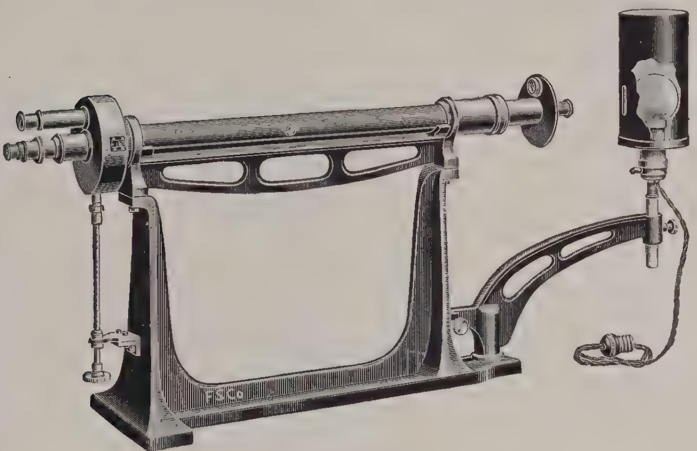
Length over all, inches	4	6	8
Each	**$1.00**	**1.25**	**1.50**

13-775. PLIERS, Button, straight; for lifting cupel beads. Length over all, 5 inches. Made of drop-forged steel. **Each, $1.00**

13-780. PLIERS, Gas Tongs. Made of forged steel, with black finish handles. Length over all, 8 inches. **Each, $1.20**

13-785. PLIERS, Combination. Gas plier, wire cutter, wrench, and screw driver combined; made of tool steel, drop-forged, nickel-plated. Length over all, 6 inches. **Each, $ .75**

POLARISCOPES AND SACCHARIMETERS



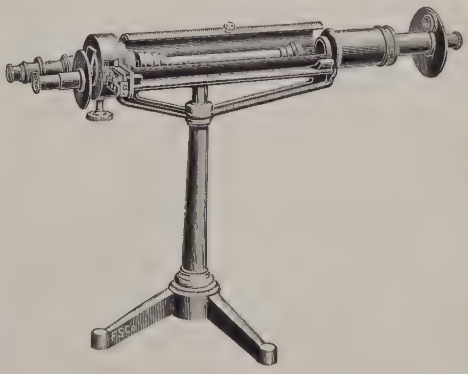
13-790

13-790. POLARISCOPE, Schmidt & Haensch, Half Shadow, Direct Reading, with Quartz Wedge Compensation; 400 mm. size for the Analysis of Sugar by the optical rotation method, see *Spencer, "Handbook for Cane-Sugar Manufacturers," 141 (1917)*. This polariscope is of the Soleil-Ventzke type with a modified Jellet-Cornu Nicol prism and quartz wedge compensation. The wedge is attached to a scale calibrated from minus 35 to plus 110 degrees in the Ventzke units. Using a standard sugar solution and a 200 mm. tube, each division corresponds to one (1) per cent of sugar. With the 100 mm. tube, each division represents two (2) per cent, and with the 400 mm. tube, one-half (½) per cent sugar. A vernier, on the scale, permits readings to be made to $\frac{1}{10}$ division. A lens mounted on a disc around the inlet tube, focuses light on a mirror which reflects it onto the scale. A lens near the eyepiece facilitates reading this scale. The polariscope is mounted on a cast-iron trestle stand, and has an auxiliary adjustable light support which carries an electric lamp equipped for use on 110 volt current.

Supplied with one each of the 100, 200 and 400 mm. observation tubes. **Each, $528.00**

13-795. POLARISCOPE, Saccharimeter, Schmidt & Haensch, Half Shadow, Direct Reading, with Quartz Wedge Compensation; 200 mm. size for the Analysis of Sugar. For method, see *Spencer "Handbook for Cane-Sugar Manufacturers," 142 (1917)*. This polariscope is of the Soleil-Ventzke type with a modified Jellet-Cornu Nicol prism and quartz wedge compensation. The wedge is attached to a scale calibrated from zero to plus 35 degrees, and can be read directly in percentage of sugar when the 200 mm. tube is used. When a 100 mm. tube is used, the scale reading should be multiplied by two. A vernier permits of reading to 0.1% sugar. A lens mounted on a disc around the inlet of the telescope, focuses a beam of light onto a mirror, which reflects it onto the scale. A lens, mounted near the eyepiece, facilitates reading the scale.

Polariscope as described, mounted on a heavy iron pillar stand, with two 200 mm. observation tubes, without lamp. **Each, $400.00**



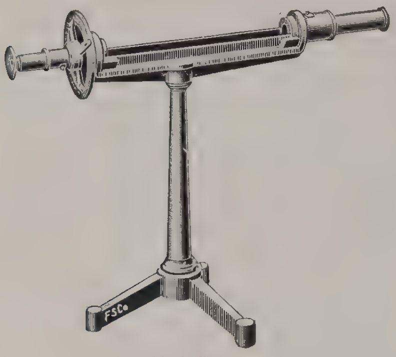
13-800
See also No. 13-795

For Illuminators for No. 13-795 Polariscope, see No. 13-810 and No. 13-815.

13-800. POLARISCOPE, Clinical, Schmidt & Haensch, Half Shadow, Direct Reading, with Quartz Wedge Compensation; 200 mm. size for the determination of sugar in urine. This polariscope is similar to the No. 13-795 Polarimeter, but has a scale graduated to read directly in percentage of sugar in urine, when the 200 mm. tube is used. This Polariscope has a protecting chamber around the compensating wedges. When the 100 mm. tube is used, the scale reading should be multiplied by two.

Clinical Polariscope, with one (1) 100 mm. and one (1) 200 mm. observation tubes, without lamp. **Each, $283.00**

Polariscopes



13-805

13-810

13-815

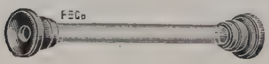
13-805. POLARISCOPE, Schmidt & Haensch, Half Shadow, Mitscherlich, with Laurent Polarizer, 200 mm. size. This polariscope is recommended for general polarimetry and saccharimetry, for students' use for clinical diagnostic and for industrial use. It has a Nicol prism with the Laurent Polarizer mounted in one-half of the field of vision. The telescope, which focuses on the line of demarcation between the two fields, rotates with the analyzing Nicol prism and carries a vernier which moves over a scale calibrated in degrees. The vernier permits of reading the scale to 0.1 degree. The polarizer is mounted on a pillar stand and will accommodate tubes up to 240 mm. in length. Polarizer as described, without tubes or lamp. **Each, $175.00**

For Tubes for No. 13-805 Polariscope, see No. 13-820 and No. 13-830.
For Illuminator for No. 13-805 Polariscope, see No. 13-810 and No. 13-815.

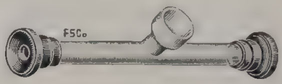
POLARISCOPE, Ultzmann; for the determination of sugar in urine, see No. 6-595, page 214.

13-810. POLARISCOPE LAMP, Electric; for use with Polariscopes. This lamp has a frosted bulb and asbestos shield with a slot in one side so that the beam of light is concentrated. It is supported on a heavy cast-iron tripod which is adjustable for height, and is supplied with a cord and plug for connection to a 110-volt lamp socket. **Each, $40.00**

13-815. POLARISCOPE LAMP, Gas, Sodium Flame; for use with Polariscopes. This lamp has a burner of the Bunsen type, mounted on a heavy cast-iron tripod support which is adjustable for height. The salt vaporizing tray is supported by an adjustable clamp so that either the monochromatic sodium flame or the luminous gas flame can be used as desired. The flame is surrounded by a black screen with a slot cut in one side to give a concentrated beam of light without a fringe. **Each, $24.50**



13-820



13-830

13-820. POLARISCOPE TUBES of glass, with screw ends. These tubes are accurately adjusted for length, are 15.5 mm. diameter, and are supplied with cover glasses accurately ground to fit.

Tube size, length in mm	100	200	400
Each	**$8.50**	**8.50**	**9.50**

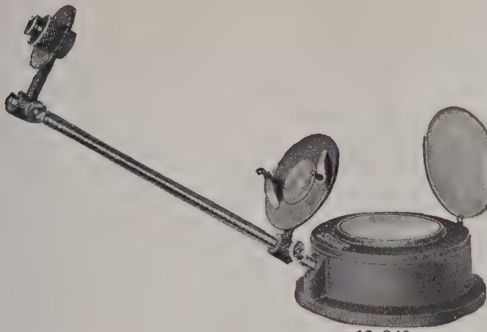
13-825. GLASS TUBES, for No. 13-820 Polariscope Tubes. The glass tube only for replacing in the metal mountings. These glass tubes are accurately adjusted for length and diameter.

Tube size, length in mm	100	200	400
Each	**$2.25**	**2.25**	**3.00**

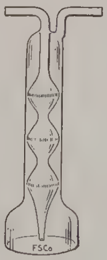
13-830. POLARISCOPE TUBES of glass, with screw ends and **thermometer well.** These tubes are accurately adjusted for length, are 15.5 mm. diameter, and are supplied with cover glasses accurately ground to fit. At the center of each tube is sealed a short wide mouth tube for receiving a thermometer, and also serves as a reservoir for the liquid displaced by the thermometer.

Tube size, length in mm	100	200	400
Each	**$11.00**	**11.00**	**12.00**

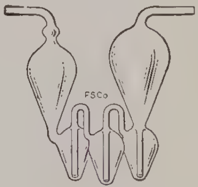
13-835. POLARISCOPE COVER GLASSES. Circular discs used on the ends of Polariscope Tubes. These cover glasses are made of optically inactive glass, 15.5 mm. diameter, ground to fit the metal mountings of standard tubes.
Each, $ .35
Per dozen, $3.50



13-840



13-845



6-840

13-840. POLARISCOPE, Strain; for determining the strains in glass. This polariscope is used for detecting strains in glassware due to uneven annealing, mechanical pressure, etc. It is also used in elementary science courses to demonstrate the phenomena of polarized light. The polarizer is a black glass mirror, mounted in a metal cap which fits over the base of the instrument. The Nicol Prism Analyzer and stage are mounted on adjustable clamps attached to a rod which is screwed into the base at the polarizing angle for light. The Nicol prism rotates within a disc, graduated to 5 degrees, but which may be estimated to 1 degree. The stage has two spring clamps for holding the specimen. It can be rotated to facilitate examination. A ground glass plate mounted on the base, diffuses the light impinging upon the mirror. The base is hollow and felt-lined to serve as a storage space for the accessories. **Each, $37.50**

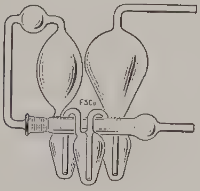
POLISHERS, see No. 12-265 and No. 12-270; also No. 13-015.

POTASH BULBS

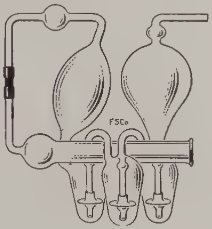
These bulbs can be filled with various liquid absorbents, and used for the removal of different constituents from vapor streams. POTASH BULB, Johnson, see No. 7-520, page 249. **POTASH BULB, Vanier,** see No. 7-535, page 250. **ABSORPTION BULBS, for solid absorbents,** see pages 249 to 251.

13-845. *POTASH BULB, Bowen. It has three bulbs with the edges ground so as to retard the flow of the bubbles and break them up, thereby exposing a greater absorption area. Bottle is blown glass, so that it can be weighed on a balance. Height over all, 155 mm. **Each, $2.00**

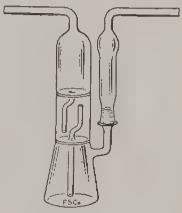
6-840. *POTASH BULB, Geissler, plain form. Height over all 115 mm. . . . . **Each, $2.00**



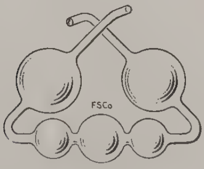
13-850



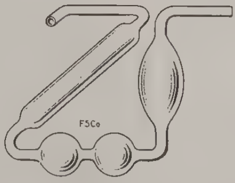
13-855



13-860



13-865



13-870

13-850. *POTASH BULB, Geissler, with drying tube. The drying tube is connected by a ground glass joint. Height over all 115 mm. **Each, $3.00**

13-855. *POTASH BULB, Geissler-Wetzel. Supplied with glass baffles in the lower bulbs, and drying tube attached by rubber tubing. These baffles slide on glass dip-tubes, and break up the gas stream. Height over all 125 mm. **Each, $3.00**

13-860. *POTASH BULB, Gomberg. Supplied with drying tube on the side, and connected by a ground glass joint. Height over all 125 mm. **Each, $3.00**

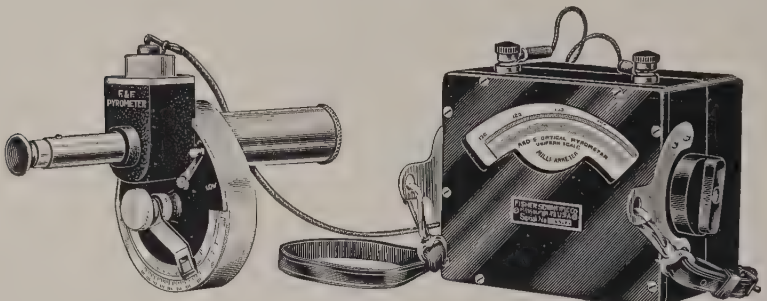
13-865. *POTASH BULB, Liebig, with five bulbs. Height over all 100 mm. . . . . **Each, $1.00**

13-870. *POTASH BULB, Norris, plain; as used in the Norris Sulphur Apparatus for the determination of sulphur in iron and steel. Height over all 100 mm. **Each, $1.40**

**Recommended by the American Chemical Society, Standardization Committee.*

PYROMETERS

THE F. & F. OPTICAL PYROMETER



13-875

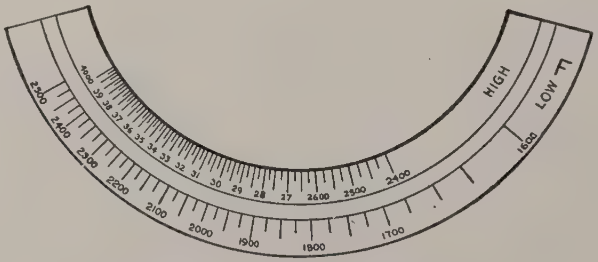
13-880

13-875. PYROMETER, Optical, Fisher & Foote (F. & F.), Patented. An accurate and convenient instrument for measuring high temperatures. Designed, patented, and made by the Fisher Scientific Company.

To take a temperature reading with the F. & F. Optical Pyrometer, one merely observes the heated object through the telescope, rotates the knurled head of the pointer as directed and reads the temperature on the scale of the instrument. *The principle of the Pyrometer is an old established law of physics that the light emitted from a heated object is directly proportional to its temperature.

The F & F. Optical Pyrometer contains in a simple and compact form, a predetermined standard lamp and a means of varying the light emitted by the heated object. The Pyrometer is scientifically correct and very sensitive and accurate, yet it is quite simple and rugged. Its use requires no special training, and it will withstand ordinary handling in the mill or factory.

Description. The Pyrometer consists of a telescope containing a special standardized incandescent lamp, the filament of which is in the field of vision. A circular glass absorption wedge is rotated in front of the field illuminated by the heated object. In looking through the telescope, the heated object is observed with the filament of the lamp superimposed on it. The wedge is rotated until the filament of the lamp disappears. A separate case contains a dry battery, also an ammeter and rheostat for adjusting the lamp current to standard condition.



Direct Reading Scale of F. & F. Optical Pyrometer

Fig. 1

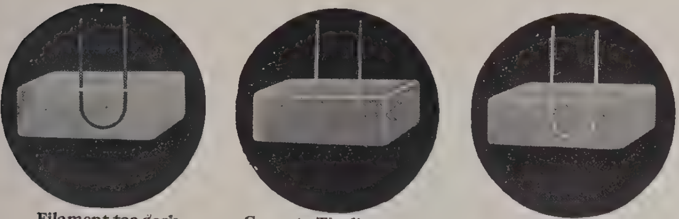
Range. The standard F. & F. Optical Pyrometer has a range of temperature from 1600° F. to 4000° F. or its equivalent in centigrade, 870° to 2200° C. If desired, the Pyrometer can be made for temperatures higher than these, by inserting additional absorption screens.

Figure 1 shows the temperature scale which is attached to the Pyrometer, and as the absorption wedge is rotated, the pointer attached to the knurled head moves across the scale so that when the filament disappears the pointer indicates the temperature of the article observed. No calculating, tables or charts are necessary.

**NOTE. A special booklet containing the technical data concerning the F. & F. Optical Pyrometer will be sent to those interested, upon request.*

F. & F. OPTICAL PYROMETER

(Continued)



Filament too dark

Correct—Tip disappears

Filament too light

APPEARANCE OF FIELD
when adjusting the wedge to cause the tip of the filament to merge with the mage of the object observed

13-885
with F. & F. Pyrometer

Uses. The F. & F. Direct Reading Optical Pyrometer can be advantageously used in almost every instance where high temperatures are measured, and is particularly well adapted to the following:

Fuel Beds
Heat-Treating-Furnaces
Muffle Furnaces
Steel Rolling Mills
Forgings and Billets
Electric Furnaces
Molten Steel and Slag
Molten Cast Iron
Molten Non-Ferrous Metals
Molten Glass
Ceramic Furnaces
Arsem Vacuum Furnace
Carborundum and Alundum
Refractories
Coke Ovens
Annealing
Fusing Point of Ash
Research and Laboratory Work

It is being used by a large number of firms for factory control of operations where materials are melted, welded, heat treated, rolled, forged, or otherwise worked at high temperatures. In every furnace operation, a certain minimum temperature is necessary; where the temperature of the furnaces is not known, this minimum temperature is greatly exceeded. The F. & F. Pyrometer enables the operation of the furnace at the proper temperature, and effects a big saving in the fuel cost.

FEATURES OF THE F. & F. OPTICAL PYROMETER

1. The F. & F. Optical Pyrometer never comes in contact with the heated object, and there is no delay in waiting for the Pyrometer to come up to temperature nor the accompanying inconvenience to the man using it.
2. Small objects can be viewed with this Pyrometer, and the temperature of the object itself measured; this temperature may or may not be the same as the temperature of the furnace.
3. The temperature of molten materials and heated objects may be measured in all stages of operation, such as in the furnace, pouring, rolling, heat treating, forging, etc.
4. Readings are not dependent upon delicate electrical measuring instruments.
5. There is no deterioration of the instrument with use.
6. It is very valuable for research work because it will read the highest temperatures, and it enables accurate reading to be made under conditions heretofore impossible.
7. The Pyrometer is sensitive but not delicate, it is accurate and at the same time rugged. This is a combination quite unusual in scientific instruments, and one which took a long time to develop.
8. The cost of upkeep is less than that of any other high-temperature Pyrometer.

F. & F. Optical Pyrometer No. 13-875 with **Fahrenheit** scale from 1600 to 4000 degrees. Supplied with ammeter and rheostat, and directions for use.
Each, $175.00

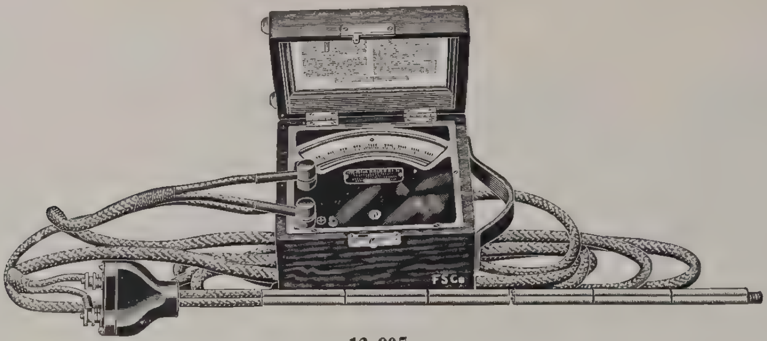
13-880. PYROMETER, Optical, F. & F., same as No. 13-875 but with **Centigrade** scale from 870 to 2200 degrees.
Each, $175.00

13-885. TRIPOD STAND, for F. & F. Optical Pyrometer. This stand is not a necessary accessory, as the pyrometer is usually held in the hand and sighted on the object. It is quite convenient for laboratory operations where a number of readings are taken in the same position; the pyrometer can be fixed in this stand and the stand adjusted to sight on the object. This Tripod Stand is rigid, and has universal adjustments.
Each, $20.00

13-890. LAMP, for F. & F. Optical Pyrometer; to replace the lamp supplied with the pyrometer. A new lamp requires no recalibration of the scale on the pyrometer; a normal point is given for the lamp and the operator merely adjusts the ammeter to this point and the scale readings are correct. **Each, $5.00**

13-895. BATTERY, for F. & F. Optical Pyrometer; to replace the battery supplied with the pyrometer. This is a special compact unit containing three Burgess dry cells, designed to give the proper current over a long period.
Each, $4.00

13-900. LAMP, for Wanner and Scimatco Optical Pyrometers, 6 volts. Although both of these types of pyrometers were superseded some time ago by the F. & F. Pyrometer, we carry these lamps in stock for the convenience of those who are still using them. This is a small sized lamp with base to fit the Wanner and Scimatco Pyrometers. It is to be standardized in the pyrometer by means of the amyl acetate lamp.
Each, $3.50



13-905
See also No. 13-915

13-905. PYROMETER, Brown, Base Metal Thermocouple, High Resistance; with automatic temperature compensation. This pyrometer can be used for many laboratory and factory operations. The indicator is a high-resistance galvanometer which can be carried about and used as desired. The scale of the indicator is 5 inches long, and is equipped with a mirror to avoid parallax errors. The galvanometer movement is of the two-pivot construction, which is the most rugged type.

Automatic temperature compensation is accomplished in this instrument by means of two bimetallic Birguet spirals, one mounted on a second indicator used for the zero setting, the other mounted on the moving element. This automatically compensates at the meter for the effect of change in temperature, not only of the cold junction which is extended to the meter, but also for the temperature coefficient of the meter.

Range. This pyrometer has the standard range of temperature from **zero to 2000° F.**

Thermocouple and leads. The couple is 36 inches long and is made of nickel-chromium and nickel-aluminum. The lead wires are 15 feet long, are of the same composition as the thermocouple, and are made flexible. The couple is equipped with a standard type terminal head which will hold a silica protecting tube, if this is desired. The wires of the couple are insulated by short porcelain tubes.

Pyrometer with indicator, thermocouple, insulators, and thermocouple head, 15 foot leads, without silica tube. **Each, $119.50**

13-910. THERMOCOUPLE, Base Metal; 36 inches long, with insulators, without head. For replacement of the couple supplied with No. 13-905. **Each, $10.25**

13-915. PYROMETER, Brown, Platinum Thermocouple, High Resistance; with automatic temperature compensation. The indicator of this outfit is of the same construction, and has the same temperature compensations as No. 13-905.

Range. This pyrometer has the standard range of temperature from **75 to 3000° F.**

Thermocouple and leads. The couple is 24 inches long and is made of platinum and platinum-rhodium, and the leads are 15 feet long and are made of a material which brings the cold junction to the indicator. The couple is equipped with a standard type terminal head and a 24-inch silica protecting tube.

Pyrometer with indicator, platinum thermocouple, insulators, head, silica tube, and leads. **Each, $187.00**

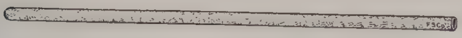
13-920. THERMOCOUPLES, Platinum; for use with No. 13-915 Pyrometer. The bare couple without insulators or head.

Length, inches	24	36
Each	**According to the platinum market.**	

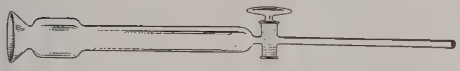
THE ADVANTAGES OF THE STANDARDIZED APPARATUS IN THIS CATALOGUE

The identical article in this catalogue can always be replaced, because it has been standardized and made according to blue prints and specifications.

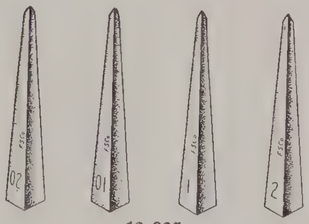
Laboratory stock room problems are simplified because a great many unnecessary sizes and shapes have been eliminated and the laboratories drawing on the stock room can specify the standardized articles listed in this catalogue.



13-925
See also No. 13-930



13-940
See also No. 13-945



13-935

13-925. PYROMETER PROTECTING TUBES, Silica; for use with platinum thermocouples. Inside diameter of tube, 10 mm.; one end closed. An iron pipe is screwed to the terminal head to cover the portion of the thermocouple not covered by the silica tube.

Length, inches	12	24
Each	**$3.50**	**4.75**

13-930. PYROMETER, Insulating Tubes. Short hard fired clay tubes which are placed over the wire of a thermocouple. Style A has one hole, and is 8 mm. outside diameter; it is used for base metal couples. Style B is used for platinum couples, and has 2 holes; it is 6 mm. outside diameter.

Style	A	B
Number of holes	1	2
Inside diameter, mm	5	1
Length, inches	3	4
Per dozen	**$ .75**	**1.75**

13-935. PYROMETRIC CONES, "Seger Cones"; made of clays of different softening temperatures. The cones are narrow and about 3 inches high; when a cone is subjected to a temperature equal to or greater than its "falling point," it will soften and the apex will bend over and down. By placing a series of these in a furnace and noting their condition, the temperature can be judged. If the cones are allowed to remain in the furnace for a period of time, which treatment is called "soaking," they will "fall" at somewhat lower temperatures than those given.

Each cone has its number impressed in it; the "falling temperature" for each number is as follows:

No.	.022	.021	.020	.019	.018	.017	.016	.015	.014	.013
Fahrenheit	1094	1148	1202	1256	1310	1364	1418	1472	1526	1580
Centigrade	590	620	650	680	710	740	770	800	830	860
No.	.012	.011	.010	.09	.08	.07	.06	.05	.04	.03
Fahrenheit	1634	1688	1742	1778	1814	1850	1886	1922	1958	1994
Centigrade	890	920	950	970	990	1010	1030	1050	1070	1090
No.	.02	.01	1	2	3	4	5	6	7	8
Fahrenheit	2030	2066	2102	2138	2174	2210	2246	2282	2318	2354
Centigrade	1110	1130	1150	1170	1190	1210	1230	1250	1270	1290
No.	9	10	11	12	13	14	15	16	17	18
Fahrenheit	2390	2426	2462	2498	2534	2570	2606	2642	2678	2714
Centigrade	1310	1330	1350	1370	1390	1410	1430	1450	1470	1490
No.	19	20	21	22	23	24	25	26	27	28
Fahrenheit	2750	2786	2822	2858	2894	2930	2966	3002	3038	3074
Centigrade	1510	1530	1550	1570	1590	1610	1630	1650	1670	1690
No.	29	30	31	32	33	34	35	36	....	....
Fahrenheit	3110	3146	3182	3218	3254	3290	3326	3362	....	....
Centigrade	1710	1730	1750	1770	1790	1810	1830	1850	....	....

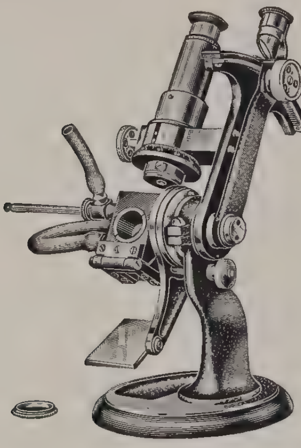
All numbers of Pyrometric Cones are the same price. **Each, $ .05**
Box of 50 of one number, **$1.50**

13-940. REDUCTOR TUBE, Jones. Used in the determination of iron, molybdenum, vanadium, phosphorous, or other similar polyvalent elements. The reductor is filled with 40 to 60 mesh zinc, and the solution containing the metal to be determined is then passed through. The zinc is attacked, evolving hydrogen which reduces the valency of the element. The quantity of the element is then determined by titration with standardized oxidizing agent.

For details of method, see *Blair "Chemical Analysis of Iron"* and *Scott "Standard Methods of Analysis."*

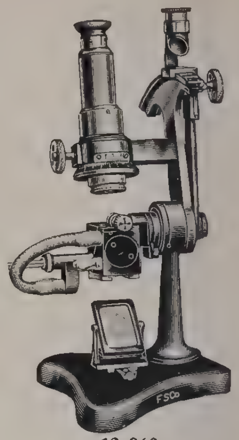
This tube has a large-bore stopcock; the outside diameter of tube is 1⅛ inches, and over all length, 18¾ inches.
Each, $2.25

13-945. REDUCTOR TUBE, Alcoa. Used for the same purposes as those mentioned under No. 13-940. This tube is longer than the No. 13-940 Tube, being 22½ inches over all, and the funnel part is also larger. It has a large-bore glass stopcock.
Each, $2.75



13-950

REFRACTOMETERS
AND
SACCHARIMETERS



13-960

13-950. REFRACTOMETER, Abbé, Zeiss; for the determination of the Indexes of Refraction and Dispersion of liquids and solids by measuring the angle of total reflection of the substance. For method, see *Findlay "Practical Physical Chemistry," 95, 1923.* This is the original make of Abbé Refractometer. It has a pair of rotating water-jacketed Abbé prisms, hinged together below the observing telescope. As the distance between the prisms is very short, determinations can be made with only a few drops of liquid, even though the color be quite dark. The telescope is fastened to a sector, graduated from 1.300 to 1.700, to read directly in nD units. The index can be estimated to about 3 units in the fourth decimal place. Within the telescope, between the objective and the double prism, are two Amici prisms which are rotated in opposite directions. These serve to achromatize the dividing line between the light and dark fields under observation, making its image sharp, distinct and colorless. A gauge on the telescope indicates the angular rotation of these prisms. By means of tables supplied, the Index of Dispersion can be readily calculated from this angle.

Refractometer is supplied **with a thermometer** for the prism jacket, a bottle of monobromonaphthalene for making immersion contact in measuring the solids, and tables for calculating the Index of Dispersion, complete in case. **Each, $222.00**

13-955. THERMOMETER, for No. 13-950 Refractometer. For replacement of the thermometer supplied with the Refractometer. **Each, $3.00**

13-960. REFRACTOMETER, Abbé, Spencer; for the determination of the Indexes of Refraction and Dispersion of liquids, plastics and solids, by measuring the angle of total reflection of the substance. For method, see *Findlay "Practical Physical Chemistry," 95, 1923.* This refractometer has a pair of rotating water-jacketed Abbe prisms, hinged together, below an observing telescope. As the distance between the prisms is very short, determinations can be made on a few drops of liquid even though the color be quite dark. The telescope is fastened to a sector graduated from 1.300 to 1.700, to read directly in nD units. With little practice the Index of Refraction can be estimated to within one or two units in the fourth decimal place. Within the telescope between the objective and the double prism, are two sets of Amici prisms which are rotated in opposite directions. These serve to achromatize the dividing line between the light and dark fields under observation. By measuring the angle through which they are rotated, as indicated by the graduated scale, the Index of Dispersion can be readily calculated from the tables supplied. A mirror mounted below the prisms moves along a horizontal bar, which greatly facilitates obtaining light from various positions.

A thermometer for the prism jacket, and a bottle of monobromonaphthalene for making immersion contact in measuring solids, are also supplied. Refractometer as described. **Each, $250.00**

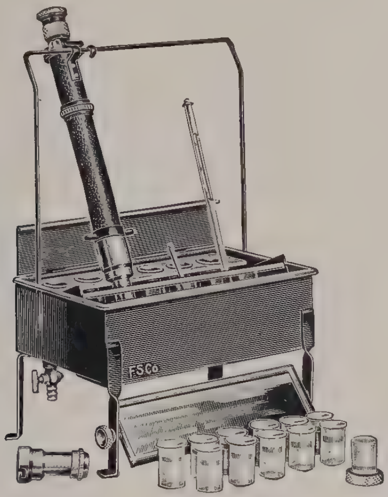
13-965. REFRACTOMETER, Dipping, Zeiss; for the measurement of the refractive indexes of liquids by observing the border line of total reflection of a substance. For method, see *Zeitschrift für physikalische Chemie 18, 294 (1895)*, and *Journal of the Society of Chemical Industry, 29, 397 T (1920)*. To make a measurement with this refractometer, the prism at the lower end is simply immersed in the solution contained in a glass beaker and the position of border line on the scale in the telescope noted. By referring this reading to tables supplied with the instrument, the Index of Refraction is obtained.

Due to the difference in dispersion between glass and liquids, the border line between the light and dark parts of the field of observation, is usually fringed with color. To overcome this, a compensating prism is mounted in the telescope. By rotating this prism, the line of demarkation is made sharp and colorless. A micrometer screw, mounted near the eyepiece, aids in locating the border line on the scale, so that with little practice, readings to within a few units in the fifth decimal place can be readily made.

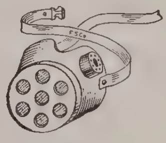
In this refractometer, the single prism, used in the older type instruments, has been replaced by a series of six interchangeable prisms which facilitate more accurate reading, and cover a range of from nD = 1.325 to nD = 1.492. Each of the prisms can be fitted with an auxiliary prism, which enables a measurement to be made with a few drops of liquid. (These prisms are listed separately.)

To overcome the effect of temperature on Index of Refraction, this refractometer should be used in conjunction with a constant temperature bath (see No. 13-980) and Thermometer No. 13-990.

Dipping Refractometer, as described, without prisms, auxiliary prisms, water bath, or thermometer. (*See illustration on page 509.*) **Each, $132.00**



13-965
Complete outfit, including
No. 13-970, No. 13-980 and No. 13-990



13-995

14-000

13-970. REFRACTOMETER PRISM, for use in No. 13-965 Refractometer. These prisms are all interchangeable. Each prism has a metal mounting which screws into the refractometer tube.

Prism No.	1	2	3	4	5	6
Minimum, nD	1.325	1.366	1.396	1.419	1.445	1.468
Maximum, nD	1.367	1.396	1.421	1.449	1.472	1.492
Each	**$28.00**	**28.00**	**28.00**	**33.00**	**33.00**	**33.00**

13-975. REFRACTOMETER, Auxiliary Prism, for use in conjunction with No. 13-970 Prisms with the No. 13-965 Refractometer. These are special prisms to be used where only small quantities of liquid are available for analysis. Numbers correspond with the Prism numbers with which they are used.

Auxiliary Prism No.	1	2	3	4	5	6
Each	**$6.50**	**6.50**	**6.50**	**6.50**	**6.50**	**6.50**

13-980. REFRACTOMETER BATH, for use with No. 13-965 Refractometer. This bath is made of metal 7¾x12x3½ inches deep with a glass plate in one part of the bottom and a mirror for reflecting the light through it. The bath carries a supporting rod for the refractometer, is provided with water inlet and outlet, and is supplied with 24 glass beakers. **Each, $18.00**

13-985. GLASS BEAKER, for use in No. 13-980 Bath; diameter 25 mm., height 45 mm. with etched band for marking. **Each, $ .20**

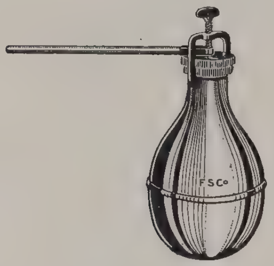
13-990. THERMOMETER, for use in Bath No. 13-980. In armored case; range, 15 to 25° C........ **Each, $10.50**

13-995. RESPIRATOR, Automatic; for protection of throat and lungs in laboratories, factories, mines, etc. where the atmosphere is filled with dust and light fumes. Made of soft white rubber, which fits the face perfectly, and fitted with nickel-plated valve for breathing purposes. Respirator is fitted with a cloth gauze and a sponge which is moistened when ready to use, and absorbs the fumes present. Fitted with elastic headband and buckle. **Each, $1.75**

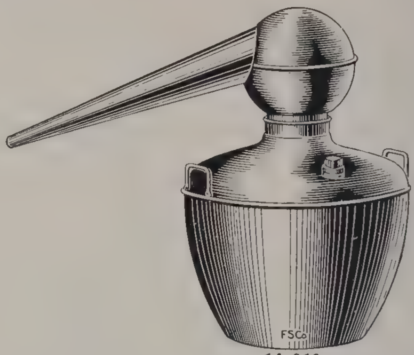
13-998. SPONGES only, for No. 13-995 and No. 14-000 Respirators.............................. **Each, $ .25**
Per dozen, $2.50

14-000. RESPIRATOR, Automatic. This is used for the same purpose as No. 13-995 Respirator. Fitted with soft rubber air cushion controlled by means of a nickel-plated valve which is connected by rubber tubing. The respirator proper is made of aluminum, and has automatic valve for breathing purposes. Filtering device consists of brass wire gauze, and sponge which is moistened when ready for use. Fitted with adjustable elastic headband. **Each, $3.50**

RETORTS



14-005



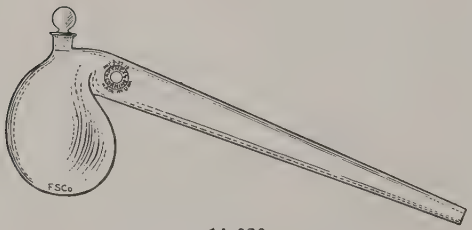
14-010

14-005. RETORTS, Copper. Suitable for making oxygen. Made of heavy polished copper, with iron clamp and brass delivery tube, 13 mm. diameter. The upper and lower portions of retort are folded together, then brazed and the joint filled with hard solder.

Capacity, ml	250	500	1000
Each	**$3.25**	**3.75**	**4.25**

14-010. RETORTS, Copper. With handles and removable head; made of heavy polished copper, block tin lined. The retort is provided with an opening in the side which is fitted with a screw plug. This opening is used for refilling the retort. A thermometer can be inserted in this opening, if desired. Condensers No. 7-765 can be used with these retorts, for making distillations.

Capacity, gallons	1	2	3
Each	**$12.50**	**14.50**	**19.75**



14-020
See also No. 14-015 and No. 14-025

14-030

14-015. RETORTS, Resistance Glass, Stoppered; with tubulature and ground-in glass stopper.

Capacity, ml	60	125	250	500	1000
Each	**$ .80**	**1.00**	**1.25**	**1.50**	**2.00**

14-020. RETORTS, Pyrex Glass, Stoppered; with tubulature and ground-in glass stopper. These are the same as No. 14-015, but made of Pyrex glass, which will not soften at temperatures below 800° C.

Capacity, ml	125	250	500
Number of retorts to a case	36	28	18
Each	**$2.40**	**2.80**	**3.80**

Case lots, 10% discount

14-025. RETORTS, Pyrex Glass; with tubulation, but without glass stopper. The 275 ml. size is a special one made according to Barrett and A.S.T.M. Specifications D 38-24.

Capacity, ml	125	250	275	500
Number of retorts to a case	36	28	24	18
Each	**$1.60**	**2.00**	**2.40**	**3.00**

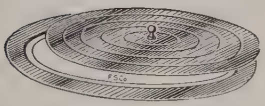
Case lots, 10% discount

14-030. RETORTS, Cast Iron; machined inside and on the top; used for distilling mercury, etc. Cover which is also cast iron, is held by a heavy cast iron screw-clamp. The cover has a ground flange so that it fits the retort tightly. Delivery tube is screwed into the cover. Retort has three legs on which it stands firmly.

Capacity, pints	½	1	2
Inside diameter, inches	2¾	3½	4⅛
I.P. size of delivery tube, inches	⅛	¼	¼
Approximate weight, lbs	5	7	8
Each	**$4.75**	**5.25**	**5.75**

RETORTS, Skidmore, see No. 8-190, page 271.
RHEOSTATS, Sliding Contact, see No. 9-525, page 324.

RINGS



14-035

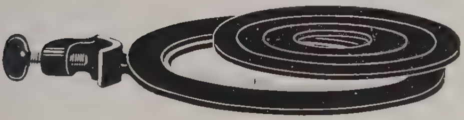
14-040

14-035. RINGS, Copper, Concentric. Made of polished copper, tinned inside; there is a cover with knob, in the center of each set. Each ring is recessed to take the next smaller ring.

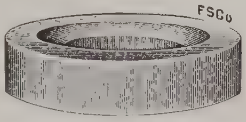
Number of rings in set	3	4	5	6	7
Outside diameter of largest ring, inches	4	5	6	6⅞	8
Per set	**$ .70**	**.90**	**1.15**	**1.60**	**2.10**

14-040. RINGS, Porcelain, Concentric; glazed on the upper side. There is a cover with knob, in the center of each set. Each ring is recessed to take the next smaller ring.

Number of rings in set	4	6
Outside diameter of largest ring, mm	120	160
Per set	**$1.80**	**2.40**



14-045



7-835

14-045. RINGS, Cast Iron, Concentric, with clamp holder; japanned cast iron, with screw clamp on largest ring for attaching to support. There are four rings in the set; the largest ring is 8 inches outside diameter.
Per set, $1.25

7-835. RINGS, Cork (Suberite); made of compressed cork, for supporting flasks, dishes, etc. Superior to straw rings, being neater and more durable.

Diameter (inside), mm	60	90	120	150
Each	**$ .62**	**.80**	**1.05**	**1.40**
Per 10	**$5.58**	**7.20**	**9.45**	**12.50**

14-050

14-055

14-050. RINGS, Iron, with clamps; black enameled, with screw-clamp and brass screw, for attaching to supports. Distance from rod to center of rings is 4½ inches, making all sizes of rings concentric when attached to the same support.

Outside diameter, inches	2	3	4	5	6	7
Each	**$ .20**	**.22**	**.25**	**.30**	**.35**	**.40**

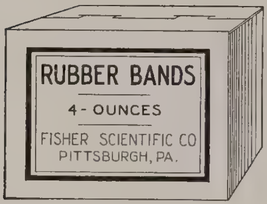
Dozen lots of a size, 10% discount

14-055. RINGS, Iron, Extension; black enameled, with arm 7½ inches long. For fastening to supports by means of No. 5-755 and No. 5-760 Clamp Holders.

Outside diameter, inches	3	4	5
Each	**$ .18**	**.22**	**.25**

ROASTING DISHES, see No. 8-785, page 295.

RUBBER ARTICLES



14-060

14-065

14-070

REGARDING LABORATORY ARTICLES OF RUBBER

It is impossible to judge the quality of rubber articles from general names such as "stoppers," "black tubing" or "white tubing," or from the price. The intrinsic or utilitarian value varies with the quality and quantity of rubber contained, and the quality of the compounding materials.

The composition of the popular rubber articles has been determined with reference to its use; this quality has been standardized under definite names, and is maintained. We guarantee it to be the same at all times.

***F. S. Co. Rubber Stoppers* No. 14-130, No. 14-135, and No. 14-140 have "F. S. Co." in raised letters on each stopper.**

***Scimatco Laboratory Tubing* No. 14-150 and No. 14-155 has the indelible trade-mark every 18 inches.**

***Fisher Laboratory Tubing* No. 14-160 and No. 14-165 is permanently marked with the trade-mark four (4) times on every 50-foot length.**

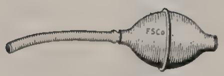
14-060. RUBBER BANDS, of pure rubber, assorted sizes; in ¼-pound boxes.................... **Per box, $ .75**

14-065. RUBBER BULBS, for dropping bottles, medicine droppers, etc.; capacity, 2 ml........ **Per dozen, $ .25**
Gross lots, 10% discount

14-070. RUBBER BULBS. Necks have heavy walls and grip tightly; used for large pipettes, syringes, etc.

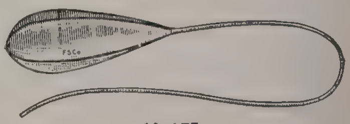
Capacity, ml	10	30	60
Length, mm	45	70	80
Diameter, mm	27	38	43
Each	**$ .15**	**.30**	**.35**

Dozen lots of a size, 10% discount



14-075
See also No. 14-080

14-085



10-675

14-075. RUBBER BULB, Atomizer; with two metal valves and 4 inches of tubing. Very convenient for use on wash bottles, etc. Capacity, 75 ml. **Each, $ .40**
Dozen lots, 10% discount

14-080. RUBBER BULB, Atomizer, with hard rubber valves. This bulb has two hard rubber valves and 4 inches of rubber tubing for connecting to wash bottles, etc. Capacity, 75 ml. **Each, $ .55**
Dozen lots, 10% discount

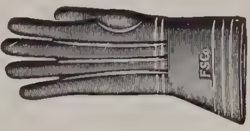
14-085. RUBBER BULB, Double Acting; suction or pressure; with hard rubber connections for tubing, on both ends. Used for taking samples of gases, for forcing or drawing gases through apparatus, etc. **Each, $ .85**

10-675. RUBBER EXPANSION BAG, Orsat. Made of flexible rubber with long rubber tube. For attaching to the rear compartment of gas absorption pipettes, to protect the absorbent from the atmosphere. **Each, $1.40**

RUBBER CAPS, for Test Tubes; see No. 14-980, page 545.
RUBBER FINGER COTS, see No. 10-000, page 341.

14-090

14-095



14-100

14-090. RUBBER GLOVES. Made of medium weight, pure rubber, seamless. These gloves are heavier than "surgeons" gloves. Specify rubber glove size in ordering.

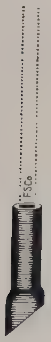
Rubber glove size	7½	8	8½	9	10
Corresponding kid glove size	6½	7	7½	8	9
Per pair	**$ .90**	**.90**	**.90**	**.90**	**.90**

14-095. RUBBER GLOVES, heavy white, with gauntlet. Made of heavy, white rubber, cloth lined, with 5-inch gauntlets. Suitable for rough work, and for handling acids in the laboratory. Specify rubber glove size in ordering.

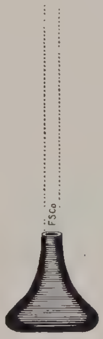
Rubber glove size	14	15
Corresponding kid glove size	8	9
Per pair	**$4.00**	**4.00**

14-100. RUBBER GLOVES, Black Rubberized Cloth, with gauntlet. Made of medium weight, black rubberized cloth, very strong, with 4-inch gauntlet. For protection from chemicals, etc. Usual size, which corresponds to No. 8 kid glove. **Per pair, $3.25**

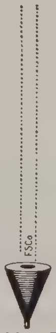
GLOVES AND MITTENS, Asbestos, see page 20.



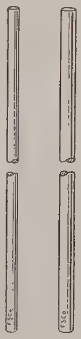
14-105



14-110



14-115



14-120

14-105. RUBBER POLICEMEN, with ends sealed flat and cut at an angle. For protecting the ends of stirring rods, and scraping precipitates from walls of beakers. Without glass rods.

For rods, diameter, inches	⅛	$\frac{3}{16}$
Per dozen	**$ .65**	**.65**

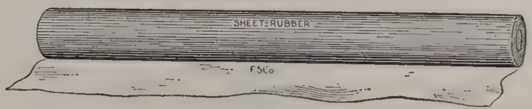
Gross lots, 10% discount

14-110. RUBBER POLICEMEN, wing shape, of soft thin rubber. Size, one (1) inch wide by 1¼ inches long; to take $\frac{3}{16}$ inch glass rod. Without glass rods. **Per dozen, $1.00**

14-115. RUBBER POLICEMEN, cone shape, with soft tip, overall length, ¾ inch, diameter at top, ½ inch, will take $\frac{3}{16}$ inch glass rods. Without glass rods. **Each, $ .15**
Per dozen, $1.20

14-120. GLASS RODS, with fire-polished ends to fit rubber policemen.

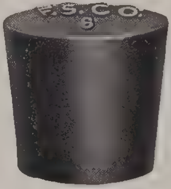
Diameter, inches	⅛	$\frac{3}{16}$
Length, inches	6	6
Per dozen	**$ .30**	**.35**



14-125

14-125. RUBBER SHEET, so-called Dental Dam; pure rubber, light weight, weighing about 5 ounces per square yard. In 36-inch widths.
Per foot, 36-inch width, **$ .70**
Per yard, 36-inch width, **$1.80**

14-130



14-130

14-135

14-140

14-145

F. S. Co. RUBBER STOPPERS

These stoppers are made according to our own compound, which gives them the balanced physical properties required for satisfactory use. They combine pliability, endurance, and resistance to permanent deformation. The quantity of rubber was determined experimentally, and this is all new rubber; no shoddy or reclaimed rubber is used. The compounding materials are pure, and have a high chemical resistance.

The holes in sizes No. 00 to No. 2, are 3 mm. diameter; in sizes No. 3 and No. 4, the holes are 4 mm diameter; in sizes No. 5 to No. 13, the holes are 5 mm. diameter, and take "under" or "over" size 6 mm. glass tubes.

The sizes listed are standard, and each stopper has its number and **F. S. Co.** in raised letters, on the top of it. They are sold by weight.

Size No.	*00*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
Top diameter, mm	14	17	19	20	23	25	27	32	37	41	45	50	56	63	68
Bottom diameter, mm	10	12	15	16	18	20	23	26	30	33	37	42	48	54	60
Approx. wt. per doz., ounces	2	3	3½	4	5	6	7	8½	12	15	19	24	30	43	52

The following catalogue numbers indicate three different styles; solid, one-hole, and two-hole. Be sure to specify which style is desired.

14-130. F.S.Co. **RUBBER STOPPERS, Solid.** All sizes.................................. **Per ounce, $ .15**
Per pound, $1.60

14-135. F.S.Co. **RUBBER STOPPERS, One-hole.** All sizes.................................. **Per ounce, $ .15**
Per pound, $1.60

14-140. F.S.Co. **RUBBER STOPPERS, Two-hole.** All sizes.................................. **Per ounce, $ .15**
Per pound, $1.60

10 lb. lots, assorted, 10% discount
25 lb. lots, assorted, 20% discount

14-145. RUBBER STOPPERS, Sulphur Free. A special stopper made for use in sulphur determinations. **Size No. 6, with 2 holes,** 32 mm. top diameter, 26 mm. bottom diameter, which fits the standard sulphur flasks. Weight per dozen, about 9 ounces. **Per pound, $3.00**

14-150 **14-155**

SCIMATCO LABORATORY TUBING

See page 515 for sizes and prices

On account of its properties, Scimatco Laboratory Tubing is the most satisfactory tubing for connecting laboratory apparatus, and is being used for this purpose by a majority of the laboratories in the United States. Scimatco Laboratory Tubing is different from the so-called "pure" tubing, in appearance and in its chemical and physical properties.

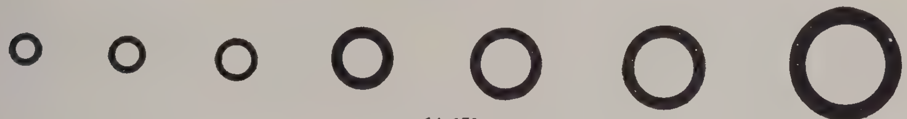
It is pure rubber, jet-black, and never turns gray.
It is cured by acid—not by the usual steam process.
It is strong and elastic, and retains these properties.
It clings to glass tubing, and makes gas-tight joints.
It can be used for connections on sulphur apparatus.

This tubing is made with two different wall thicknesses; **light wall** No. 14-150 and **heavy wall** No. 14-155. The Scimatco trade-mark appears every 18 inches on each piece of tubing.

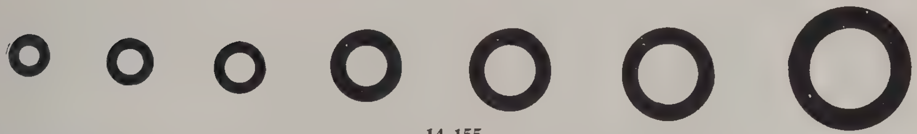
See page 515 for sizes and prices.

SCIMATCO RUBBER TUBING

(continued)



14-150



14-155

14-150. SCIMATCO LABORATORY TUBING, Light Wall. *(See description on page 514).*

Inside diameter, inches	1/8	5/32	3/16	1/4	5/16	3/8	1/2
Thickness of wall, inches	1/32	1/32	1/32	1/16	1/16	1/16	3/32
Per foot	$ .08	.10	.14	.24	.28	.34	.60

10 feet of a size, 10% discount. **50 feet** of a size, 15% discount

14-155. SCIMATCO LABORATORY TUBING, Heavy Wall. *(See description on page 514).*

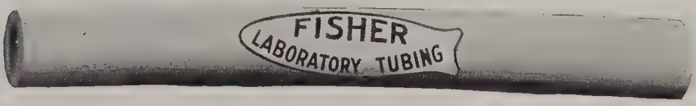
Inside diameter, inches	1/8	5/32	3/16	1/4	5/16
Thickness of wall, inches	1/16	1/16	1/16	3/32	3/32
Per foot	$ .14	.16	.20	.35	.42

10 feet of a size, 10% discount. **50 feet** of a size, 15% discount

Inside diameter, inches	3/8	1/2	5/8	3/4	1
Thickness of wall, inches	3/32	1/8	1/8	1/8	1/8
Per foot	$ .50	.75	.95	1.10	1.40

10 feet of a size, 10% discount. **50 feet** of a size, 15% discount

NOTE. The addition of coloring matter to rubber tubing is not advised. The American Chemical Society, Standardization Committee does not recommend red or other colored rubber tubing for apparatus connections.



14-160 14-165

FISHER LABORATORY TUBING

Used for making gas, blast, and water connections in the laboratory. This tubing is quite flexible, has sufficient elasticity to be stretched over a connection, and to grip it tightly, but it is strong and firm enough to withstand the usual gas, water, and blast pressures in the laboratory. These qualities are observed by applying the thumb-nail test to the end of a piece of tubing. It is white, steam-cured, is smooth inside, and has a cloth impression on the outside.

The features of this tubing are: **first,** the quantity of rubber contained; **second,** it is made from the best grade of new para rubber, not reclaimed rubber; **third,** the compounds used in making this tubing have been selected for their purity and chemical resistance, and are not the ones usually employed in making composition tubing.

It is made with two different wall thicknesses; **light wall** No. 14-160 and **heavy wall** No. 14-165. The sizes and wall thicknesses of both numbers, are those recommended by the American Chemical Society, Committee on Standardized Apparatus.

The quality of this tubing has been standardized, and it is always the same. The Fisher Laboratory Tubing trade-mark appears four (4) times on every 50-foot length.

14-160. FISHER LABORATORY TUBING, Light Wall.

*Inside diameter, inches	1/8	3/16	1/4	5/16	3/8	1/2
*Thickness of wall, inches	3/64	3/64	1/16	1/16	1/16	1/16
Per foot	$ .11	.12	.14	.16	.18	.22

10 feet of a size, 10% discount. **50 feet** of a size, 15% discount

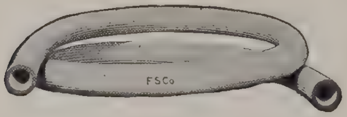
14-165. FISHER LABORATORY TUBING, Heavy Wall.

*Inside diameter, inches	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
*Thickness of wall, inches	3/32	3/32	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Per foot	$ .18	.22	.24	.28	.30	.38	.44	.55	.80

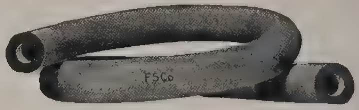
10 feet of a size, 10% discount. **50 feet** of a size, 15% discount

**Sizes recommended by the American Chemical Society, Standardization Committee.*

Rubber Tubing



14-170



14-175

14-180

13-245

14-170. RUBBER TUBING, Composition, Gas Hose. White, corrugated, machine-made, composition gas hose. This is an inexpensive composition, used where the connection is intended to serve for a short time, and where price is the primary consideration.

Inside diameter, inches	$\frac{3}{16}$	¼
Thickness of wall, inches	$\frac{1}{16}$	$\frac{1}{16}$
In 10 foot lengths, per foot	**$ .09**	**.10**

100 feet of a size, 10% discount

14-175. RUBBER TUBING, Pressure and Vacuum. Black, handmade, with heavy walls to withstand suction without collapsing, and for higher pressures. Used to connect vacuum filters, etc.

Inside diameter, inches	⅛	$\frac{3}{16}$	¼	$\frac{5}{16}$	⅜	½
Thickness of wall, inches	⅛	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	¼	¼
Per foot	**$ .24**	**.26**	**.30**	**.35**	**.55**	**.80**

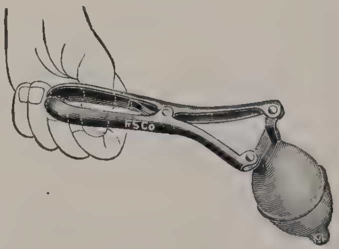
10 feet of a size, 10% discount. **50 feet** of a size, 15% discount

14-180. RUBBER TUBING, Gooch; black, pure gum, thin wall, very elastic; for Gooch crucibles, etc.

Outside measurement, when flat, inches	1	1¼	1½	1¾
Inside diameter (circular shape), inches	¾	1	1⅛	1⅜
Per foot	**$ .15**	**.18**	**.22**	**.24**

13-245. RUBBER TUBING, Nitrometer. A special rubber tubing for mercury connections for nitrometers. It is handmade, cloth-wrapped, semi-pure rubber, strong but flexible; the inside is free from talc. Inside diameter, ¼ inch; outside diameter, ⅝ inch. **Per foot, $ .45**

14-185



14-195

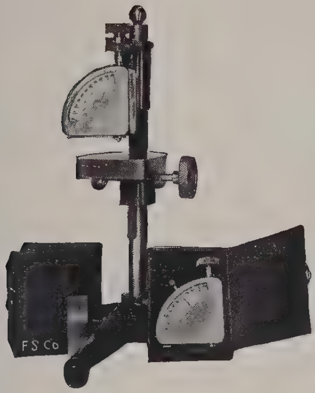
14-185. TUBING METALLIC, Flexible. Made of continuous strip of grooved steel wound spirally, with insertion of packing between layers, making it gas-tight. Very suitable for connections, burners, hot plates, etc. Each length has a heavy rubber connection on each end; these can be renewed. Inside diameter, ¼ inch.

Length, feet	2	3	4
Each	**$ .30**	**.40**	**.50**

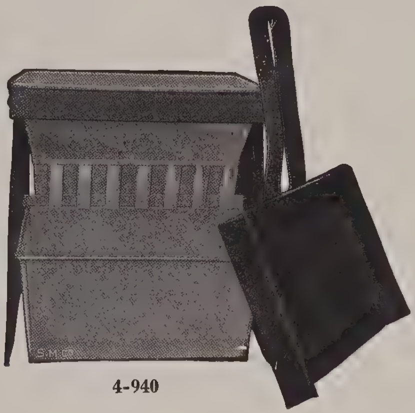
Dozen lots of a size, 10% discount

14-190. RUBBER ENDS only, for No. 14-185 Metallic Tubing. **Per pair, $ .10**
Dozen pairs, 10% discount

14-195. RUBBER TUBING STRETCHER, for stretching tubing and bulbs to facilitate attaching them to tubes, etc. Made of nickel-plated metal. Length over all, 6 inches. **Each, $ .75**



14-200 14-205
Both outfits include the upright support.



4-940

RUBBER TESTING APPARATUS

14-200. RUBBER DUROMETER, for determining the "hardness" or the resistance to penetration, of rubber and rubber products by indenting the surface under pressure of a blunt pin. This instrument is also used to check the quantity of filler used, degree of vulcanization, wearing qualities, etc., of automobile tires and rubber foot-wear.

To make the test, the Durometer is placed in contact with the material to be tested and the spring button depressed, causing the pin to penetrate the rubber. The hardness is then indicated on the gauge. A standard test piece is provided for checking the gauge. This Durometer is mounted on a permanent stand which insures the proper relative position of the Durometer and the test piece. This stand has an adjustable stage which is raised and lowered by a rack and pinion. If desired, it can be removed from the stand and carried about and used directly on the work in process through the factory.

Complete with stand. **Each, $65.00**

14-205. RUBBER ELASTOMETER, for determining the elasticity or resiliency of rubber and rubber products.

As the wearing qualities of rubber products vary as to both the hardness and the elasticity, the Elastometer should be used in conjunction with the No. 14-200 Durometer. The results obtained by multiplying the two gauge readings gives an index of the resistance to wear. This Elastometer is similar in construction to the No. 14-200 Durometer, but has a locking device on the penetration needle, which holds the needle until the hardness is overcome. On releasing the lock, the needle is released, and the rebound of the needle due to the elasticity of the piece under test is indicated on the gauge.

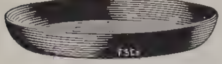
This Elastometer is mounted on a permanent stand which insures the proper relative position of the Elastometer and the test piece. If desired, it can be carried about and used directly on work in process through the factory. Complete with stand. **Each, $65.00**

RUBBER EXTRACTION APPARATUS, see No. 9-585, page 326.

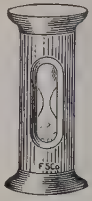
4-940. SAMPLER, for the rapid preparation of samples of dry materials. The sample is poured into the riffle at the top, and is quickly and evenly divided into two parts by means of parallel chutes, the alternate ones emptying into the same pan. The contents of each pan is usually run through the riffle again, dividing the sample into quarter portions, all containing the same quantity of material of average composition. The use of this sampler makes sampling a simple, accurate, and reproducible operation, and eliminates the errors which occur in hand mixing and sampling.

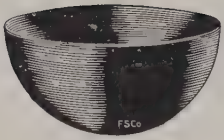
Sampler complete with distributing scoop, four sample pans, and hair brush for collecting fine materials and cleaning the riffle after use.

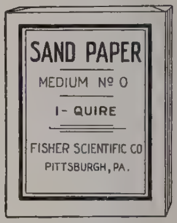
Length, inches	8	10
Number of Dividing Troughs	10	10
Width of Dividing Troughs, inches	½	¾
Each	**$15.00**	**19.00**


14-210

14-220


14-225


14-215



14-230

14-210. SAND BATHS, Shallow Form, made of sheet iron; also used for sampling pans.

Diameter, inches	4	5	6	8	10
Each	**$ .13**	**.15**	**.20**	**.45**	**.75**

Dozen lots of a size, 10% discount

14-215. SAND BATHS, Deep Form, made of sheet iron.

Diameter, inches	4	6	8	10
Each	**$ .15**	**.30**	**.55**	**1.10**

Dozen lots of a size, 10% discount

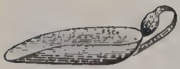
14-220. SAND BATH HOT-PLATE. Made of sheet iron, japanned, with iron legs which are permanently attached. The tray is 10 inches long by 8 inches wide by 1 inch deep; height, 8 inches. **Each, $3.50**

14-225. SAND GLASSES. Consist of two glass bulbs with a constricted opening between them. The amount of sand is adjusted to flow from one bulb to the other in a definite period of time. Mounted in a polished, wooden frame.

Time, minutes	1	2	3	5	10	15	30
Each	**$ .35**	**.35**	**.35**	**.50**	**.75**	**1.00**	**1.50**

14-230. SAND PAPER, in sheets 9 inches wide by 11 inches long.

Grade	Fine	Medium	Coarse	Extra Coarse
Number	00	0	1	2
Per sheet	**$ .05**	**.05**	**.06**	**.08**
Per quire	**$ .50**	**.50**	**.60**	**.75**


14-235

14-240

14-245

14-250

14-235. SCOOP, Agateware; seamless, with thumb-gripped handle. Length of scoop without handle, 6 inches; width, 3¼ inches. **Each, $ .50**

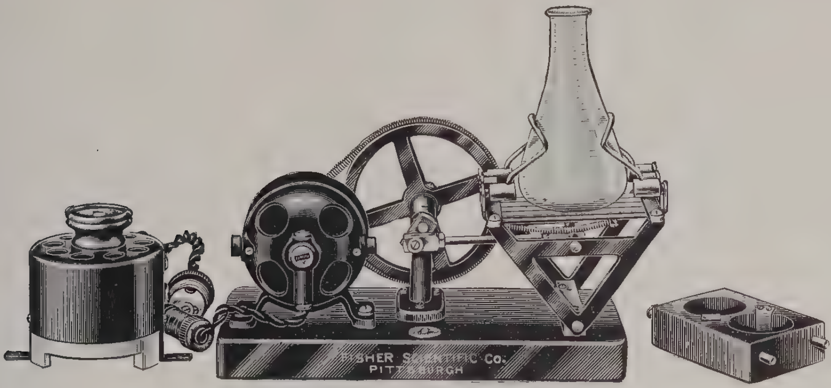
14-240. SCOOP, Agateware; seamless, with hand-gripped handle. Length of scoop without handle, 7½ inches; width, 5⅜ inches. **Each, $1.10**

14-245. SCOOPS, Horn, with handle.

Length over all, mm	100	125	160
Each	**$ .25**	**.30**	**.50**

14-250. SCORIFIERS, Denver Fire Clay; regular shape. These are made from a special mixture which will not crack, and will not pit or leave an opening for the retention of metals.

Outside diameter, inches	2	2½	3
Per dozen	**$ .80**	**1.00**	**1.25**
Per 100	**$5.00**	**6.00**	**8.00**



6-250

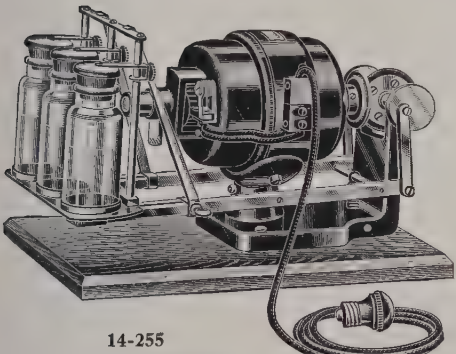
6-250. SHAKING APPARATUS, for mechanically shaking and mixing small quantities of liquids. The apparatus consists of a motor, speed reducing pulley, and a container rack. The motor is universal, and operates on a 110-volt current, either 60 cycle alternating or direct.

A rheostat in the feed line controls the speed. The speed reducing pulley is mounted on a separate shaft, and is driven by the motor by means of a spring belt, which takes up the slack at all times.

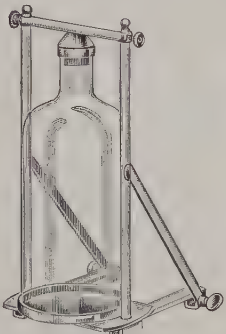
The container rack, by means of various clamps, can be arranged to hold haemacytometer pipettes, test tubes up to 120 mm. long, 2-ounce sample bottles, or a 250 ml. Erlenmeyer flask.

Supplied complete, with clamps, together with cord and plug for attaching to lamp socket.

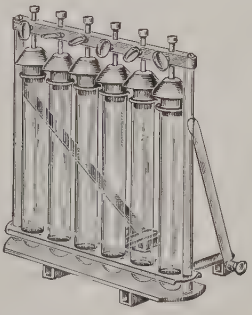
Each, $65.00



14-255
With No. 14-260 Holder



14-265



14-270

14-255. SHAKING APPARATUS, Electric. With this apparatus, the fluid container is shaken up and down in a vertical position, at the same time describing a semi-circular course, thus producing a motion similar to that employed when shaking by hand. The apparatus is very substantial, and is practically noiseless. The transmission of power from the motor to the shaking arms is accomplished with a friction drive consisting of a flat steel wheel and an adjustable leather wheel attached to the shaft that operates the shaking arms. The leather wheel is fastened with a set screw, and can be adjusted to produce the shaking effect desired. In this way the apparatus may be adjusted to shake the container very slowly, or the shaking may be increased to any degree of violence desired. The motor always runs at full speed, thus developing its maximum power at all times.

Three different kinds of holders can be supplied for this apparatus, which can be attached to the shaking arms and held by two set screws.

Apparatus as described, mounted on a finished oak base 16 inches long by 7 inches wide; with motor, shaking arms, cord and plug, but **without bottles or holders** which are listed separately. For use on **110 volts A.C., 60 cycle.** Approximate shipping weight, 65 pounds. **Each, $105.00**

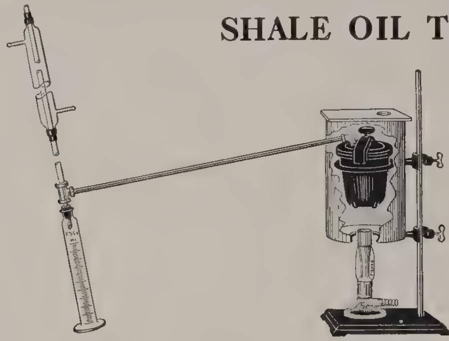
No. 14-255 can be supplied to order for use on 110-volt direct current for the same price.

14-260. HOLDER, for Three 100 ml. Bottles; for use with No. 14-255 Shaker. This is illustrated in place on the apparatus. Furnished complete with three 100 ml. rubber stoppers. **Each, $20.00**

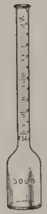
14-265. HOLDER, for One 1000 ml. Bottle; for use with No. 14-255 Shaker. Furnished complete with bottle and rubber stopper. **Each, $15.00**

14-270. HOLDER, for Six 6x¾ inch Test Tubes; for use with No 14-255 Shaker. Furnished complete with six test tubes and rubber stoppers. **Each, $22.50**

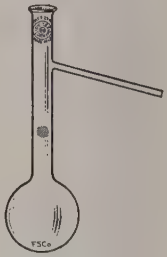
SHALE OIL TESTING APPARATUS



14-271



14-272



14-274
See also No. 14-273

14-271. SHALE OIL ASSAY RETORT APPARATUS, Karrick; for the referee assaying of shale oil, oil shale, lignites and coals by low temperature decomposition. This is a Standard Referee Apparatus designed by L. C. Karrick of the U. S. Bureau of Mines for the evaluation of volatile oils obtainable by the pyrolytic decomposition of shales and coals.

For methods of use, see Karrick, *A Manuel of Testing Methods for Oil Shales and Shale Oils*, U. S. Bureau of Mines, 1925, and McKee, *Shale Oil*, A. C. S. Monograph No. 25, 1925.

In studying the decomposition of oil shales, it was found that minor differences in the apparatus caused major differences in the rates and degrees of formation and decomposition of the kerogen and hydrocarbon vapors, vapor speed, partial and total condensation, and gas formation. With this standardized apparatus, the optimum results are obtained, are reproducible to within 1%, and are used for the determination of the commercial value of the material as a source of gasoline and other petroleum products.

Supplied, complete as illustrated; with Fisher Burner. **Each, $30.00**

14-272. SHALE OIL UNSATURATION BOTTLE. This bottle is similar to No. 6-904, but has a neck capacity of 5 ml. The neck is graduated from zero to 100% in 2% divisions and numbered at each 10% mark. **Each, $ .90**

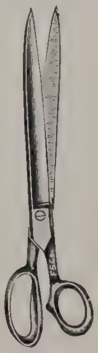
14-273. SHALE OIL TOPPING DISTILLATION APPARATUS. This is similar to No. 13-455, page 489, except that it is supplied with a Shale Oil Topping Flask, with jack-chain packing. **Each, $44.00**

14-274. SHALE OIL TOPPING FLASK, similar to the standard 100 ml. Engler Flask, but with the side tube placed on the neck 50 mm. from the mouth of the flask. Made of Pyrex glass. **Each, $ .90**

CARBON RESIDUE APPARATUS, Conradson; see No. 13-395, page 486.
SEDIMENT DETERMINATION APPARATUS; see No. 13–590, page 491.

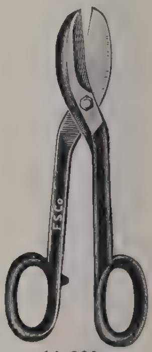
8-945

14-275



14-280

14-285



14-290

8-945. SHEARS, Small, Medium Weight; for general laboratory use. Made of steel, nickel-plated; highly polished and finely finished. Length over all, 4½ inches; length of cutting edge, 1½ inches. **Each, $ .65**

14-275. SHEARS, Trimming, Medium Weight, for general laboratory use; blades are tempered and highly polished. These shears are nickel finished throughout.

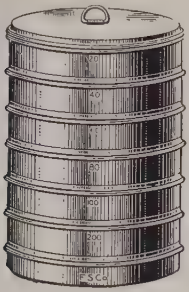
Length over all, inches	6	8
Each	**$1.50**	**2.00**

14-280. SHEARS, Large Size; strong and heavy, for cutting paper; with nickel-plated blades and japanned handles. Length over all, 10 inches; length of cut, 5¼ inches. **Each, $2.50**

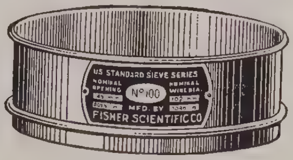
14-285. SHEARS, Heavy; for cutting cardboard and light sheet metals, also for general laboratory use; with strong short blades. Made of forged steel, fitted with screw and nut; with nickel-plated blades, and black enameled handles. Length over all, 7½ inches; length of cut, 2¼ inches. **Each, $1.50**

14-290. SHEARS, Tinners', Regular Pattern; for cutting sheet metal and wire. They are properly hardened and tempered. Made of drop-forged steel, with adjustable nut and bolt; with polished steel blades and ground handles having a dull finish. Length over all, 10 inches; length of cut, 2½ inches. **Each, $2.00**

SIEVES



14-295 14-305



4-880
See also No. 4-885

14-295. SIEVES, "Mesh" Series, Brass Frame, 5 inches diameter. The usual sieves for grading purposes. The gauze used in these sieves is made according to the "mesh" series, that is, each sieve has a definite number of meshes to the lineal inch. The wire of the sieves up to 100 mesh is brass; above 100 mesh the wire is phosphor bronze. The gauze is spun into the frame and is held evenly and firmly, without sagging or distortion. The frames are 2 inches high.

The frames are spun, one piece without seams; they are polished, and the bottom of each sieve fits tightly into the top of any other sieve of this set, also into the Receiver listed under No. 14-300. Each sieve is supplied in a separate protecting carton. **Five inch diameter.**

Mesh	10	20	40	60	80	100	120	140	150	160	180	200
Each	**$2.00**	**2.00**	**2.20**	**2.40**	**2.50**	**2.70**	**3.00**	**3.50**	**3.80**	**4.00**	**4.30**	**4.75**

14-300. COVER AND RECEIVER, Polished Brass, 5 inches diameter. For use with No. 14-295 Sieves.
Per set, $2.25

14-305. SIEVES, "Mesh" Series, Brass Frame, 8 inches diameter. Same as No. 14-295, but 8 inches diameter.

Mesh	10	20	40	60	80	100	120	140	150	160	180	200
Each	**$3.20**	**3.20**	**3.40**	**3.60**	**3.80**	**4.00**	**4.90**	**5.60**	**6.20**	**6.70**	**7.00**	**7.70**

14-310. COVER AND RECEIVER, Polished Brass, 8 inches diameter. For use with No. 14-305 Sieves.
Per set, $2.75

F. S. CO. – U. S. STANDARD SIEVES

Standard Sieves for the accurate determinations of fineness. U. S. Bureau of Standards specifications. Adopted by A.S.T.M. for cement and aggregate tests, also, for the different coal and coke fineness tests. Adopted by the U. S. Bureau of Public Roads, and by the American Association of State Highway Officials.

A sieve opening one millimeter square, is the unit adapted for this series, and the ratio of any sieve opening to the next smaller opening in the series is definitely fixed. The diameter of the wire for each sieve has also been fixed. Although the dimensions used as a basis for this series is the Metric system, the dimensions in inches are also given for each sieve, and users can refer to these dimensions if they prefer.

In this series, each size has been assigned a number which refers to the specifications for that sieve, and as this number very closely approximates the number of meshes-per-inch, it serves as an identification in terms of "mesh." This will be observed from the following specifications:

U. S. Sieve No.	***4***	***8***	***10***	***16***	***20***	***30***	***40***	***50***	***60***	***70***
Opening, mm	*4.76*	*2.38*	*2.00*	*1.19*	*.84*	*.59*	*.42*	*.297*	*.250*	*.210*
Opening, inches	*.187*	*.0937*	*.0787*	*.0469*	*.0331*	*.0232*	*.0165*	*.0117*	*.0098*	*.0083*
Wire diameter, mm	*1.27*	*.84*	*.76*	*.54*	*.42*	*.33*	*.25*	*.188*	*.162*	*.140*
Wire diameter, inches	*.070*	*.0331*	*.0299*	*.0213*	*.0165*	*.0130*	*.0098*	*.0074*	*.0064*	*.0055*
**Tolerance, average, %*	*3*	*3*	*3*	*3*	*5*	*5*	*5*	*6*	*6*	*6*

U. S. Sieve No.	***80***	***100***	***120***	***140***	***170***	***200***	***230***	***270***	***325***
Opening, mm	*.177*	*.149*	*.125*	*.105*	*.088*	*.074*	*.062*	*.053*	*.044*
Opening, inches	*.0070*	*.0059*	*.0049*	*.0041*	*.0035*	*.0029*	*.0024*	*.0021*	*.0017*
Wire diameter, mm	*.119*	*.102*	*.086*	*.074*	*.063*	*.053*	*.046*	*.041*	*.036*
Wire diameter, inches	*.0047*	*.0040*	*.0034*	*.0029*	*.0025*	*.0021*	*.0018*	*.0016*	*.0014*
**Tolerance, average, %*	*6*	*6*	*6*	*8*	*8*	*8*	*8*	*8*	*8*

**Tolerances given are + or − for the average opening.*

4-880. SIEVES, F. S. Co. United States Standard, Brass Frame, 8 inches diameter. These sieves are supplied in the 8 inch size, as this is the only size recommended by the U. S. Bureau of Standards. The frames are 2½ inches high and are spun from one piece, without a seam. Each sieve is supplied in a separate protecting carton. *For size of sieve opening and diameter of wire, see specifications given above.*

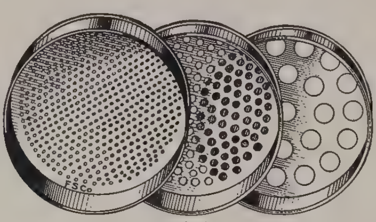
U. S. Sieve No.	4	8	10	16	20	30	40	50	60	70
Each	**$5.00**	**5.00**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**	**4.85**	**5.00**

U. S. Sieve No.	80	100	120	140	170	200	230	270	325
Each	**$5.50**	**6.15**	**6.50**	**7.30**	**7.80**	**9.50**	**11.50**	**16.00**	**20.00**

4-885. COVER AND RECEIVER. Made of polished brass, 8 inches diameter; for use with No. 4-880 Sieves.
Per set, $3.50

SIEVES, for Soil Testing, see No. 14-330, page 524.

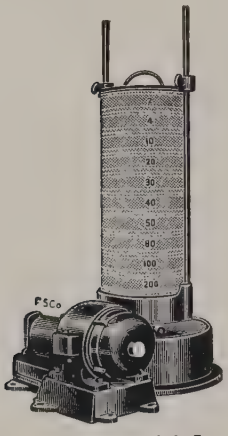
Sieve Shakers



4-900

4-900. **SIEVES, Round Holes, Brass Frame, 8 inches diameter.** These sieves have circular openings in brass sheet, and are used for grading broken stone, slag, etc.

Diam. of sieve opening, inches	2	1½	1¼	1	¾	½	¼
Diam. of sieve opening, cm	5.08	3.81	3.18	2.54	1.90	1.27	0.64
Height of frame, inches	2½	2	1⅝	1⅝	1⅝	1⅝	1⅝
Each	**$5.25**	**4.50**	**3.75**	**3.75**	**3.75**	**3.75**	**3.75**



4-910 4-915
See also No. 4-905

4-920

4-905. **SIEVE SHAKER, Hand or Power, Drive,** for the automatic grading of cement, sand, etc., according to size. This shaker converts, by means of cams, the rotary motion of the drive wheel to a semi-rotary eccentric throw followed by a vertical drop. This motion serves to keep the material moving progressively around the sieve, and at the same time, cleans the meshes of any clogging. The time necessary for making a test is thus greatly shortened. As the stroke is always of the same character and strength, the test can be standardized, and so be made reproducible, thus eliminating any of the inaccuracy due to the hand shaking method.

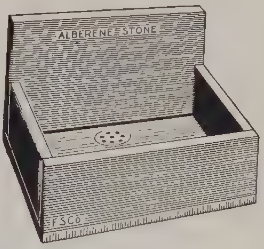
Machine is mounted on heavy cast base with heavy sieve supports and clamps. It will accommodate sieves, cover and receiver of the No. 4-880. Standard 8 inch, Full Depth Size. Machine is supplied complete, but without sieves; for hand power. **Each, $150.00**

4-910. **SIEVE SHAKER, Automatic, Electrically Driven.** This shaker is the same as the No. 4-905, but is directly coupled to a **110-volt direct current motor.** **Each, $300.00**

4-915. **SIEVE SHAKER, Automatic, Electrically Driven.** This shaker is the same as the No. 4-905, but is supplied with **110-volt alternating current motor.** **Each, $300.00**

4-920. **AUTOMATIC INTERVAL ELECTRIC TIMER,** for use with No. 4-910 and No. 4-915 Automatic Sieve Shakers. This Timer consists of an electrically operated clock and circuit breaker. The clock is of special rugged construction for heavy duty and hard usage. It never requires winding. When the hand is turned to the right the switch is closed and the clock starts. The hand can be set for any time period up to 60 minutes. At the end of the time period for which it has been set, the clock will automatically open the circuit, but will continue to run for two minutes for additional safety. After once having been set, the clock may be reset to change the length of run by merely resetting the hand. By turning it back to zero, the circuit may be opened and the test stopped. The Timer is supplied with a cord and plug for direct insertion into a lamp socket of the laboratory, and has a receptacle for receiving the plug of the Sieve Shaker. By using this Timer a test may be started, and the clock set. The operator is then free to go about and make other tests. When the shaker has been in operation the required time, the clock automatically stops it and the test is ready for the operator to take up and complete at his leisure. **Each, $12.00**

ALBERENE STONE
can be fabricated for table tops, frame hoods, partitions, etc.
We shall be glad to quote on your requirements



14-315

14-315. SINKS, Laboratory, Alberene, Acid-Proof Stoneware. On account of the action of chemicals and acids, ordinary sinks are not suitable for laboratory use. Our sinks are made from Alberene stone, which is a natural quarried stone, gray in color, close-grained, non-porous, and of uniform density and hardness. It is not affected by heat or cold, and is distinctly acid-repellent, making these sinks very satisfactory for the laboratory.

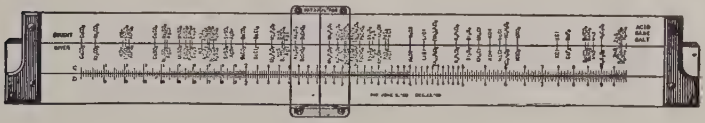
These sinks are made from five pieces, 1¼ inch thick, with joints tongued and grooved, bolted together and then cemented with acid-proof cement. The waste hole is drilled in the center, at the back. The backs of these sinks extend 8 inches above the top of the sink.

Each sink is supplied with an acid-proof stoneware double-flanged nipple and a round plate having a number of small holes; this fits into the top of the nipple and acts as a strainer. This nipple fits into the hole of the sink, and has a stone pipe about 2¾ inches long for connecting to waste pipe. Made in two sizes as listed below. Dimensions given, are the inside dimensions of the sinks.

Size	A	B
Length, inches	30	24
Width, inches	20	18
Depth, inches	8	8
Shipping weight, lbs	325	290
Each	**$54.00**	**46.00**

The Sinks listed are standard sizes carried in stock; other sizes and shapes can be made to order.

SLEEVES, Protecting, see No. 1-360, page 16.



14-320

14-320. SLIDE RULE, Chemists', Duplex. Designed to adapt the logarithmic and cologarithmic scales to the rapid solution of the problems encountered by the chemist. The symbols on the rule, being in order of their molecular weight, are easily found, while the application of a very simple rule enables the chemist to locate other symbols of less frequent occurrence. Aside from the solution of the chemical problems above referred to, arithmetical problems solvable by logarithms are readily and accurately done with a minimum number of settings.

The rule carries 138 chemical symbols, which include the common acids, bases, oxides, salts, and elements employed by the average chemist. As each symbol has its individual position corresponding to the logarithm of its molecular weight, the number of permutations and combinations possible covers the requirements of almost any problem. By using the logarithmic and cologarithmic scales in conjunction with the chemical gauge points, problems in Stoichiometry, such as Gravimetric Analysis, Volumetric Analysis, Equivalents, Percentage Composition, Conversion Factors, Volume of gas from a given weight of substance at different temperatures and pressures, and many other analogous problems are readily solved.

It is engine divided and may be relied upon to an extent equal to the operation of the ordinary analysis, and for this reason it may be employed in calculating results or checking calculations made by other methods. The rule is accompanied by a Manual giving the theory of its use, together with numerous examples of both arithmetical and chemical nature. Length 10 inches, engine divided, divisions on white facings, glass indicator; in leatherette case with directions. **Each, $12.50**

SODIUM SPOONS, see Deflagration Spoons, page 286.

SOIL TESTING APPARATUS

14-325

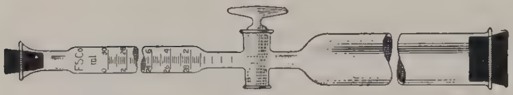
14-325. SOIL TEST SET, La Motte. A compact, portable outfit for use in determining the acidity reaction of soils according to the method of Dr. N. T. Whorry, Jr. (*Washington Academy of Science, April, 1920*). It was especially designed for use in the field but it may also be used with equal convenience in the laboratory.

The set includes 20 ml. vials, with rubber nipples and pipettes, containing the aqueous solutions of the following indicators, covering the range from pH 3.0 to 8.8:

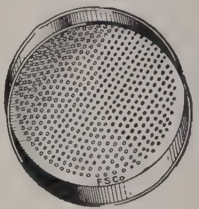
Bromphenol Blue	pH 3.0 – 4.6
Bromcresol Green	pH 4.0 – 5.6
Bromcresol Purple	pH 5.2 – 6.8
Bromthymol Blue	pH 6.0 – 7.6
Cresol Red	pH 7.2–8.8

Three extra vials are provided for making and testing the soil extracts. All equipment is included in a polished wooden case 4¼ x 3⅞ x 1¾ inches, which can readily be slipped into the worker's pocket for carrying.

Price complete, with directions and table of values for interpolating measured readings. **Each, $6.00**



3-795



14-330

3-795. SOIL ACIDITY BURETTE, Carr, for determining the acidity of a soil by the Potassium Thiocyanate Method. The burette consists of two portions connected through a stopcock.

The upper portion is about eight inches long. It has a funnel shaped mouth and is fitted with a rubber stopper; it is calibrated to contain 30 ml., graduated in 0.2 ml. divisions, and is numbered up and down. **The lower portion** is a large cylindrical chamber about twelve inches long, and has a capacity of about 150 ml. The lower end is closed with a rubber stopper.

Method. The method consists essentially of introducing a weighed sample of the soil into the lower portion of the burette, and plugging the mouth with a rubber stopper. The burette is then inverted and the potassium thiocyanate, measured in the graduated portion, is run over the soil. The burette is then shaken to aid in the extraction. Standardized alkali is then introduced into the graduated portion of the burette and measured. From time to time small quantities of this are admitted to the extraction chamber, and the quantity noted, until the solution changes color or shows the end point. From the total volume of alkali used, the acidity of the soil can then be calculated.

For further details of the method, see R. H. Carr, *Jour. Ind. Eng. Chem. 13, 931 (1921)*, and Mahin and Carr, "*Quantitative Agricultural Analysis*" *266 (1923)*. **Burette with stoppers, Each, $4.25**

SOIL COLORIMETER, Shriner, for the determination of Nitrate Nitrogen in soils according to the method described in Mahin and Carr, "*Quantitative Agricultural Analysis,*" *336 (1923)*. See No. 7-155, page 233.

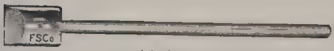
14-330. SOIL TESTING SIEVES. Seamless brass frame, with brass plates having small circular perforations. Diameter, 5 inches.

Diameter of openings, mm	1	2	3
Each	**$2.10**	**2.10**	**2.10**

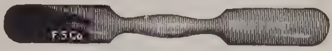
COVER AND RECEIVER, 5 inches diameter; for use with No. 14-330 Soil Sieves. **Per set, $2.00**

SOLENOID, for Electrolytic Separations, see No. 9-275, page 315.

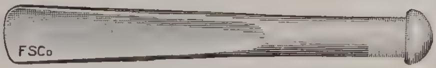
SPATULAS



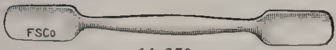
14-335



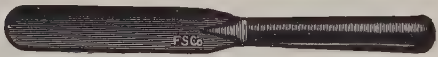
14-340



14-345



14-350



14-355

14-335. SPATULA, Glass. The end of the blade is beveled and ground on both sides. Length over all, 6 inches; width of blade, ¾ inch. Used for mixing, etc. **Each, $ .35**

14-340. SPATULAS, Horn, with spatula on each end.

Length over all, mm	125	150	200
Each	$ .25	.30	.45

14-345. SPATULAS, Porcelain, glazed; with spatula on one end, knob on the other.

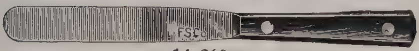
Length over all, mm	200	310	420
Each	$ .45	.75	1.50

14-350. SPATULAS, Porcelain, glazed; with spatula on each end.

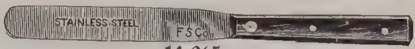
Length, over all, mm	120	150
Each	$ .25	.30

14-355. SPATULAS, Hard Rubber throughout, with handle and wide flexible blade.

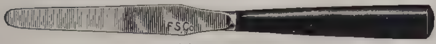
Length of blade, inches	4	6
Each	$ .45	.55



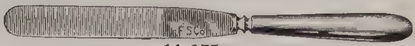
14-360



14-365



14-370



14-375

14-360. SPATULAS, Flexible Steel blade, with riveted wooden handles.

Length of blade, inches	3	4	6	8	10	12
Each	$ .35	.40	.55	.70	1.25	1.60

Dozen lots of a size, 10% discount

14-365. SPATULAS, Stainless Steel. With flexible, stainless steel blades, and riveted wooden handles. Stainless steel is non-corrosive and non-rusting.

Length of blade, inches	4	6
Each	$ .85	1.20

Dozen lots of a size, 10% discount

14-370. SPATULAS, Weighing; with tapering steel blades which are thin and very flexible; with wooden handles. Adapted for use as a palette knife for mixing, and are very convenient for handling materials when accurately weighing small quantities.

Length of blade, inches	3	4	6
Each	$ .65	.80	1.10

Dozen lots of a size, 10% discount

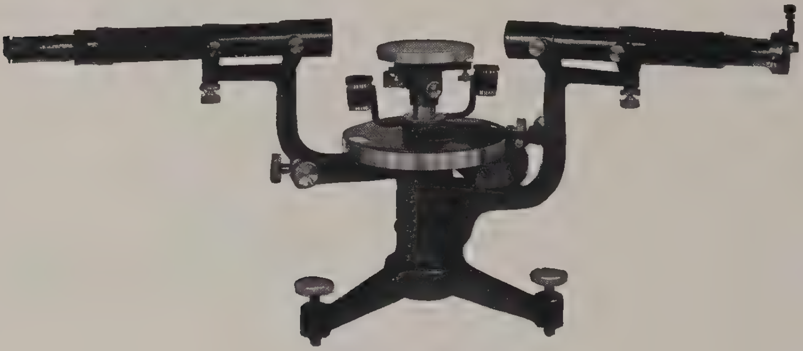
14-375. SPATULAS, All Metal; with flexible steel blade and solid steel handle; nickel-plated.

Length of blade, inches	3	4	6
Each	$ .80	.90	1.10

Dozen lots of a size, 10% discount

SPECIFIC GRAVITY BOTTLES, see pages 94, 95 and 96.

SPECTROMETERS AND SPECTROSCOPES

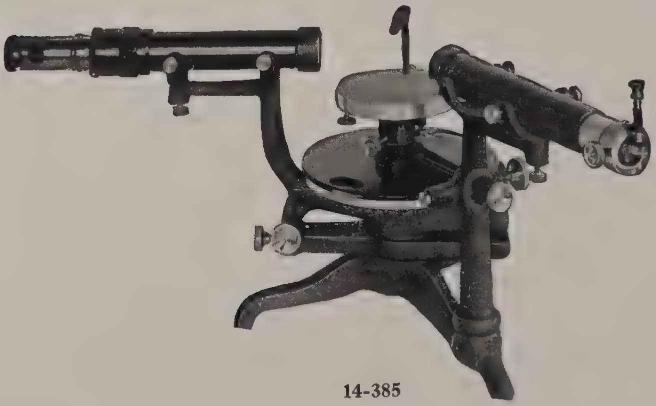


14-380

14-380. SPECTROMETER, Laboratory; for spectrum analysis requiring a high degree of accuracy. In this spectrometer, the table is adjustable for height, and can be rotated independently of, or along with the verniers.

The verniers are graduated in black on white celluloid, read to 20 seconds of arc, and are fitted with reading lenses. The telescope and collimator are mounted in double cradles which permit of both vertical and horizontal adjustments. The telescope is focused by turning a knurled ring instead of the usual drawtube, and is of standard bore so as to take standard eyepiece micrometers or auto collimating eyepieces. The telescope is supplied with a Gauss eyepiece of 25 mm. focus. The slit is adjustable and is regulated by a fine screw and has a comparison prism for projecting a secondary spectrum into the telescope for comparison purposes.

Prism supplied with this Spectrometer is made of heavy flint glass, index of refraction 1.65, with an angle of 60 degrees between the two polished faces. The faces are 54 x 27 mm. **Each, $258.00**

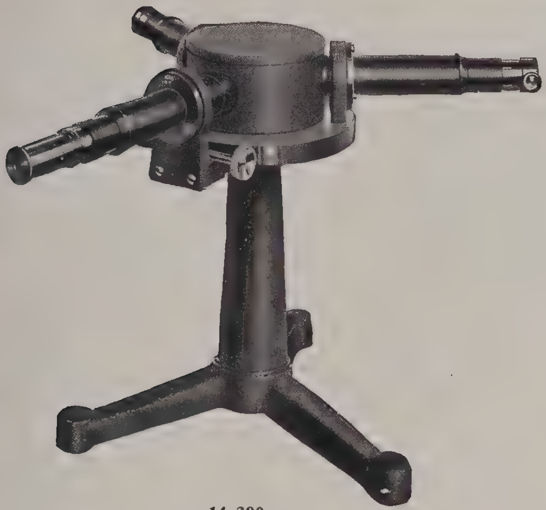


14-385

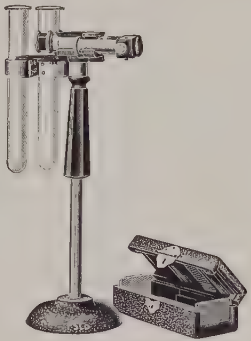
14-385. SPECTROMETER, Students. This spectrometer is recommended for general student use, and for measuring spectrums with an accuracy of one angular minute. The observing telescope rotates around the prism table independently of the table, while the collimator is fastened directly to the base. Both the telescope and the collimator are focused by drawtubes, and are mounted in double cradles which have both vertical and horizontal adjustments. The telescope is supplied with a Gauss eyepiece. The objectives are achromatic lenses, 25 mm. aperture, with focal lengths of 160 mm. The slit can be adjusted by means of the fine regulating screw operating against a spring under tension.

Prism supplied with this Spectrometer is made of flint glass, index of refraction 1.65, with an angle of 60 degrees between the two polished faces. The faces are 45 x 22.5 mm. **Each, $108.00**

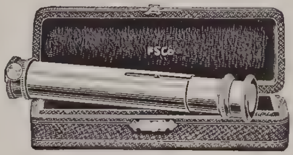
SPECTROSCOPES



14-390
See also No. 14-395



14-400



14-405

14-390. SPECTROSCOPE, Bunsen-Kirchhoff Type. This spectroscope gives a very brilliant spectrum suitable for the study and charting of the spectrums of metals. The heavy, iron tripod support carries the prism table to which the collimator and scale tubes are rigidly attached by means of flanges. The table has three leveling screws, is covered by a light-proof housing, and is adjusted for the prism supplied with the spectroscope. The telescope can be rotated around the table or clamped in position when duplicate readings are to be taken. The telescope and scale tube have simple drawtube focusing adjustments, while the slit tube has a fixed focus. The objectives of the telescope and collimator are achromatic.

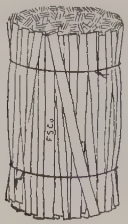
The scale covers wave-lengths from 400 to 800 Mu Mu and is about 23 mm. long. This spectroscope is recommended for general spectrum analysis and will be found sufficiently accurate for many research problems. **Each, $90.00**

14-395. SPECTROSCOPE, Bunsen-Kirchhoff Type, Students Model. This spectroscope is similar to the No. 14-390 Spectroscope, but is smaller. It gives a spectrum long enough and bright enough to enable a student to study the spectrums of the more important elements. With this spectroscope the C and F hydrogen lines appear about four divisions apart, while the two sodium lines can just be distinguished. This spectroscope is recommended for use in courses in chemistry and physics which are planned to give the student an insight into spectrum analysis. **Each, $60.00**

14-400. SPECTROSCOPE, Hand, Browning, with adjustable slit, wave-length scale and auxiliary support; for the spectrum analysis of gases and liquids. This spectroscope has an adjustable, horizontal slit for accommodating various intensities of the incoming light and has a vertical shutter which can be adjusted to cut off the upper half of the spectrum, leaving its lower half superimposed upon the wave-length scale. This gives a very definite line of demarkation which facilitates reading the position of the spectral lines. The wave-length scale can be moved horizontally so as to be "set" for any particular line of the spectrum.

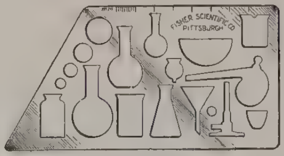
The observing telescope is adjustable for focal length. The wave-length scale is illuminated directly by the light used in the observation. This light is focused on the scale by a lens mounted in a tube beside the observing telescope. At the front of the telescope are two spring clamps, one for holding a tube of standard liquid or light filter and one for the comparison liquid. The standard tube is illuminated by direct light, while the comparison tube receives its light from a mirror which reflects it through the tube, into the comparison prism. The spectroscope is mounted on a handle which can be fitted over the top of the iron support supplied. **Each, $75.00**

14-405. SPECTROSCOPE, Direct Vision, for the spectroscopic analysis of gases and liquids. This is a simple instrument for showing the Fraunhofer lines in the spectrum of daylight, and the brighter lines of the emission spectra of solids, liquids or gases. It has a glass refracting prism mounted between two lenses in a draw tube. The slit at the end of the draw tube is adjustable for width. **Each, $14.00**



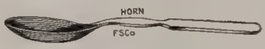
14-410

14-415



14-435

14-420



14-425

14-430

14-410. SPLINTS, Wood. These are strips of very thin wood, about 4½ inches long and about ¼ inch wide. They are put up in bundles containing 500 strips. **Per bundle, $ .20**

14-415. SPONGES, for laboratory use; best grade of grass sponge, about 16 to a pound........**Per ounce, $ .15**
Per pound, $1.50

14-420. SPOONS, Glass. Made of heavy pressed glass with the rims cut true; used on account of resistance to the action of the usual chemicals.

Size	Teaspoon	Tablespoon
Each	$ .50	1.00

14-425. SPOONS, Horn; with spoon on one end and a spatula on the other. The most convenient form, as they can be used as spoons or as spatulas.

Length over all, mm	125	150	200
Each	$ .30	.35	.45

Dozen lots of a size, 10% discount

14-430. SPOONS, Porcelain, glazed; with spoon on one end and spatula on the other.

Length over all, mm	96	120	140	160	190
Each	$ .20	.25	.30	.35	.45

STAINING DISHES, see page 296.

14-435. STENCILS, Chemical, of transparent, flexible celluloid. Contains outlines of common pieces of apparatus, with which students can quickly make drawings. The top edge of stencil has millimeter and centimeter scales. Length, 5⅝ inches; width, 3 inches.
Each, $ .15
Per dozen, $1.50

204-206 McGill St.
MONTREAL, CANADA

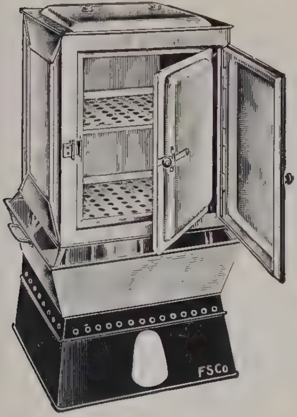
CANADIAN SERVICE

To serve the Canadian laboratories, we have a separate organization and warehouse at 204–206 McGill Street, Montreal, which cooperates with our Pittsburgh house.

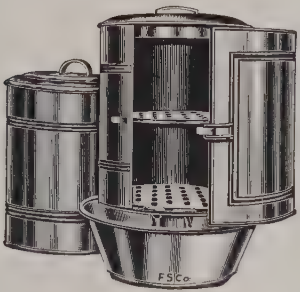
From this Canadian warehouse, the same standardized apparatus is shipped, thereby providing the laboratories in Canada with the same service as is provided for the laboratories in the United States.

STERILIZERS

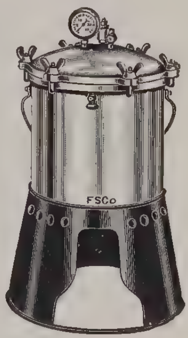
For High Pressure Autoclaves
See page 32



14-440
With Base No. 14-445



14-450
See also No. 14-455



14-460
With Base No. 14-465

14-440. STERILIZERS, Steam, Boston Board of Health Pattern. Made entirely of copper, with double wall, two removable perforated trays, and two doors. On account of the convenient shape and arrangement, quick steaming chamber, and non-rusting feature, these sterilizers have become very popular, for use without pressure.

These sterilizers have a quick steaming base which is automatically supplied with water from an open reservoir above. The water in this reservoir never boils, is always in view, and can be replenished without any interruption of the steaming process. From the reservoir the water passes through small apertures into the quick steaming base, to which the heat is applied. As the base will contain only a thin layer of water, steam is produced very rapidly, and rising through a funnel in the center of the apparatus passes to the sterilizing chamber.

Here it accumulates under slight pressure at an unvarying temperature of 100° C., and this temperature can be maintained indefinitely without any attention to the apparatus except an occasional replenishing of the water in the reservoir.

The excess of steam in the sterilizing chamber escapes around the cover and is confined under a hood, thus forming a steam jacket around the outside of the sterilizing chamber which very effectually aids in the maintenance of a uniform temperature within the chamber. As the steam is finally forced down from above and comes in contact with the air it condenses and drips back into the reservoir.

These sterilizers can be heated by any flat top stove, or by a gas or electric hot plate. If desired, No. 14-445 Enclosed Sheet Iron Bases can be used and the sterilizers heated by a usual style gas burner. The dimensions given are the inside dimensions of the sterilizing chamber.

Size	A	B
Height, inches	15¼	19½
Width, inches	12¼	16½
Depth, inches	12¼	14½
Each	**$81.00**	**135.00**

14-445. ENCLOSED BASES, for No. 14-440 Sterilizers. Made of sheet iron with an opening for inserting a burner.

For Size	A	B
Each	**$4.00**	**5.00**

14-450. STERILIZER, Steam, Arnold Pattern, Copper. Cylindrical shape with removable cover, removable perforated tray, and sterilizing chamber equipped with a door. Made **entirely of copper** that will not rust, which is not the case with the tin sterilizers.

The operation and the features of this sterilizer are the same as those described under No. 14-440; in this style, the removable cover is the outer wall of the surrounding steam jacket.

Inside dimensions, 12½ inches high by 10⅞ inches diameter. **Each, $37.00**

14-455. STERILIZER, Steam, Arnold Pattern, Tin, with copper steaming base. This sterilizer is similar to No. 14-450, excepting that the cover and the body are made of tin plate; the generating chamber at the bottom is made of copper. This is an inexpensive sterilizer which should be wiped dry after using, in order to prevent rusting.

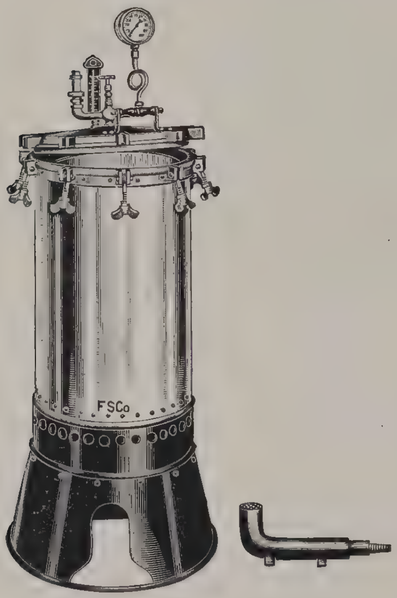
Inside dimensions of sterilizing chamber, 12½ inches high by 10⅞ inches diameter. **Each, $16.00**

14-460. STERILIZER, Pressure. Made of heavy cast aluminum, equipped with polished brass fittings, petcock, automatic safety valve, and steam gauge. It has a copper tray, 12½ inches diameter and 9 inches high which facilitates the handling of test tube baskets and other articles.

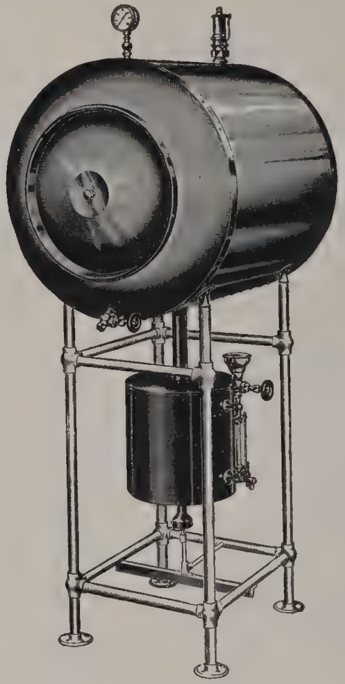
The safety valve can be adjusted to open at pressures from 3 to 20 pounds. It can be heated over any electric or gas hot plate, or it can be placed on Enclosed Stand No. 14-465 and heated with the usual style burner. **Each, $32.00**

14-465. ENCLOSED BASE, for No. 14-460 Sterilizer. Made of sheet iron with an opening for inserting a burner. **Each, $6.00**

PRESSURE STERILIZERS



14-470
See also No. 14-460



14-475
See also No. 14-480

14-470. STERILIZER, Pressure, Vertical, with hinged lids. The boiler is made of heavy copper, polished outside and tinned inside; the lid is made of heavy cast brass, nickel-plated, and fits tightly to the body by a ground-in beveled joint. The lid is held by bolts with wing-nuts; these are hinged and attached permanently to the autoclave. It is tested for steam pressures up to 35 pounds per square inch.

It is equipped with a pressure gauge, thermometer, safety valve, and a petcock which is left open until the air has been driven out of the sterilizer. It is mounted on an enclosed sheet iron base and provided with a low form burner. Size A has six bolts with wing-nuts; size B has ten bolts with wing-nuts. Dimensions given are the inside dimensions of the sterilizing chamber.

Size	A	B
Height, inches	24	26
Diameter, inches	11	14
Each	**$90.00**	**120.00**

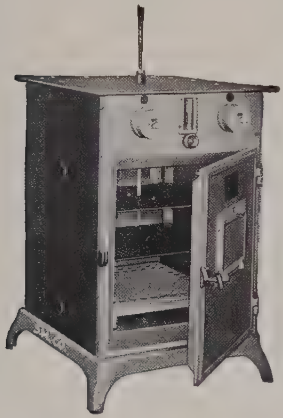
14-475. STERILIZERS, Pressure, Horizontal, Gas Heated. A convenient and popular style; used in many bacteriological laboratories. Made of polished copper with iron stand finished in aluminum. The door has a valve seat, having a ground joint, and is held by the steam pressure, without the use of gaskets. The door is cast brass, and rolls on a track inside of the housing.

The steam generator is mounted below the sterilizing chamber; this is supplied with water through the funnel on the side, and has a water gauge. This generating chamber can be heated by a gas burner. The sterilizing chamber is equipped with a pressure gauge and a safety valve.

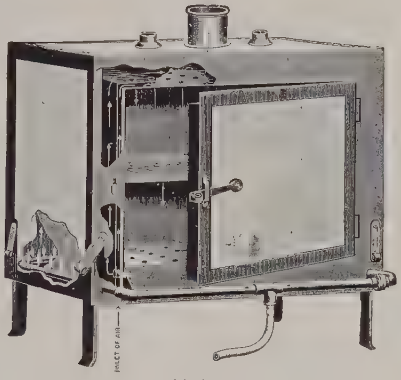
Size	A	B	C	D
Diameter, chamber, inches	17	21	23	26
Length, chamber, inches	20	24	28	28
Diameter of door, inches	10	12	14	16
Each	**$200.00**	**240.00**	**340.00**	**450.00**

14-480. STERILIZERS, Pressure, Horizontal, Steam Heated. This is the same style as No. 14-475 excepting that the generator is equipped with a coil for heating by steam. The steam pressure available must have a pressure of at least 20 pounds.

Size	A	B	C	D
Diameter, chamber, inches	17	21	23	26
Length, chamber, inches	20	24	28	28
Diameter of door, inches	10	12	14	16
Each	**$200.00**	**240.00**	**340.00**	**450.00**



14-485



14-490
See also No. 14-495

14-485. STERILIZER, Hot Air, Frease Electric, with automatic temperature control. For continuous use at constant temperature. Made of double wall transite, with metal frame, with double-walled door in aluminum frame, with observation window. Equipped with light inside the chamber. Controlled by a switch on the outside.

The thermo-regulator can be set approximately by the indicator; the close adjustment is made by observing the temperature indicated by the thermometer and adjusting the contacts accordingly. The heating unit is a transite plate wound with Nichrome wire. The thermometer supplied is 24 inches long and reads to 200° C.

The sterilizer has a cast-iron base for use on a table; with thermometer; for use on **110-volt current.** *No. 14-485 can be supplied to order for use on 220-volt current, at the same price.* **Each, $135.00**

13-280. THERMOMETER, for use with No. 14-485 Sterilizer..**Each, $5.00**

14-490. STERILIZERS, Hot Air, Gas Heated, Triple Wall. Supplied with regenerative heating system, sometimes called "Lautenschlaeger" system. The burners are built-in, and are in the outside jacket; the hot air circulates around the two air spaces formed by the three walls, and effects a uniform temperature in the inner sterilizing chamber. The burners have needle-valves on the two supply pipes; this permits the adjustment for various coal gas, gasoline gas, or natural gas. A short chimney with a damper is attached.

The oven is made of heavy sheet iron, is covered with asbestos, and has legs for standing on a table. Supplied with a 200° C. thermometer.

Size	A	B
Height, chamber, inches	12	18
Width, chamber, inches	18	24
Depth, chamber, inches	9	14
Each	**$52.00**	**67.00**

14-495. STERILIZERS, Hot Air, Electric, Triple Wall. These are the No. 14-490 Sterilizers equipped with a 3-heat regulating switch, and electric heaters instead of gas burners. The uniform temperature obtained, compensates for the larger electrical consumption in this style of sterilizer. They should be connected to a 110-volt main line; not to the ordinary lighting outlet. Supplied with a 200° C. thermometer.

The inside dimensions of the sterilizing chamber are the same as No. 14-490.

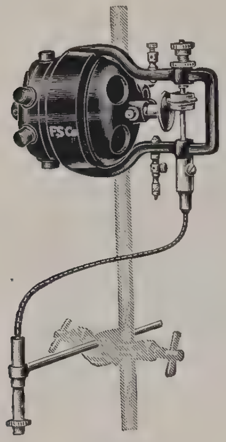
Size	A	B
Current consumption, watts	2100	3000
Each (for 110 volts)	**$128.00**	**160.00**

STILLS, all kinds, see Distilling Apparatus, pages 303 to 309.

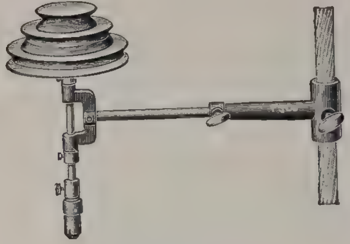
THE ADVANTAGES OF STANDARDIZED APPARATUS IN THIS CATALOGUE

The selection and procurement of approved apparatus is facilitated, prompt duplication is possible and the operation of the laboratory stock room is simplified.

Stirring Apparatus



14-500
With No. 14-505
Flexible Shaft



14-510
See also No. 14-515

14-500. STIRRING APPARATUS, Cenco Friction-Drive. The motor has a clamp by means of which it can be attached to the rod of any of the usual apparatus supports. The motor shaft has a metal disc which drives a friction disc on the stirrer shaft. By turning a knurled thumbscrew, the friction disc is moved across the face of the driving disc and different speeds from zero to 3000 r.p.m. (motor speed) can be obtained.

The stirrer can be used for electrolytic separations; one binding post is grounded through the frame to the rotating spindle, another insulated binding post on the under side of the yoke, permits convenient connection to the cathode.

Two chucks are provided; these fit on the stirring shaft. One chuck takes wires from No. 12 to No. 18 B. & S. gauge; the other chuck takes glass rods ¼ inch diameter.

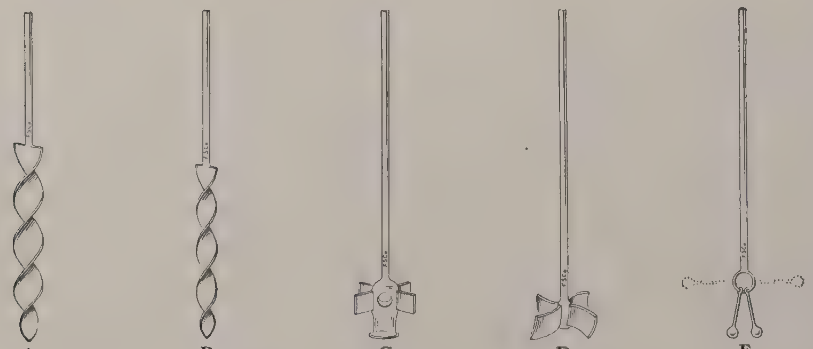
A Flexible Shaft with chuck, listed separately, permits the motor to be swung away from the beaker containing the liquid being stirred. Motor supplied with friction drive and two chucks, with connecting cord; without support or flexible shaft.

A. For 110 volt, A.C. **$30.00**
B. For 110 volt, D.C. **$30.00**

14-505. FLEXIBLE SHAFT, for use with No. 14-500. Supplied with guide to provide a bearing for the lower end, which can be attached to the support by a No. 5-755 Clamp Holder.

The shaft is 12 inches long. **Each, $4.00**

14-510. STIRRING SHAFT, with pulleys and chuck; with arm for attaching to a support. The wooden pulley has three steps, 3½, 2½, and 1½ inches diameter. Fitted with a split chuck which holds a stirring rod concentrically, and takes rods ¼ inch diameter. **Each, $8.00**



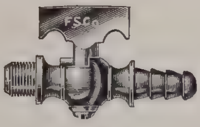
A **B** **C** **D** **E**

14-515

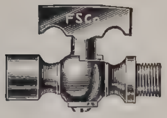
14-515. STIRRERS, Glass. For use with different stirring devices.

Style	A	B	C	D	E
Each	**$1.40**	**1.20**	**1.75**	**1.50**	**1.60**

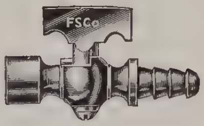
STOPCOCKS



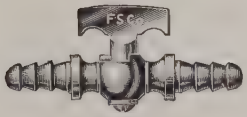
14-525



14-520



14-530



14-535

14-520. STOPCOCKS, Laboratory, Polished Brass. One end has a male thread, the other end has a female thread; for use with ⅛-inch standard iron pipe fittings. Gas and air-tight; neatly machined and finished.

Bore of plug, inch	⅛	¼
Each	$ .70	1.00

14-525. STOPCOCKS, Laboratory, Polished Brass. One end has a tapered connection for ¼-inch tubing; the other end has a male thread for ⅛-inch standard iron pipe fittings. Same quality as No. 14-520.

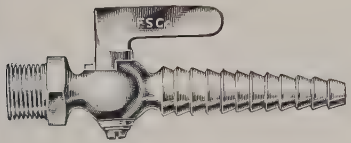
Bore of plug, inch	⅛	¼
Each	$ .80	1.00

14-530. STOPCOCKS, Laboratory, Polished Brass. One end has a tapered connection for ¼-inch rubber tubing; the other end has a female thread for ⅛-inch standard iron pipe fittings. Same quality as No. 14-520.

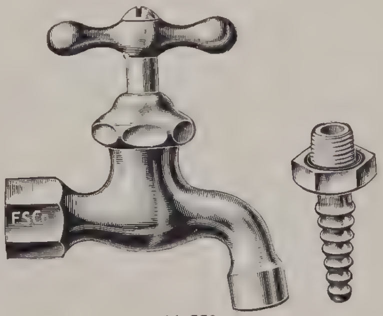
Bore of plug, inch	⅛	¼
Each	$ .70	1.00

14-535. STOPCOCKS, Laboratory, Polished Brass. Both ends have tapered connections for ¼-inch rubber tubing. Same quality as No. 14-520.

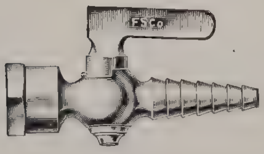
Bore of plug, inch	⅛	¼
Each	$ .90	1.25



14-540



14-550



14-545

14-540. STOPCOCKS, Laboratory, for Gas. Made of brass, nickel-plated, with ⅜-inch standard iron pipe male thread. The connection for rubber tubing is 2½ inches long, tapering from ¼ inch at the small end to ⅝ inch at the large end, and has twelve (12) serrations so that it may be safely used with tubing from ¼ to ½ inch bore. **Each, $1.30**

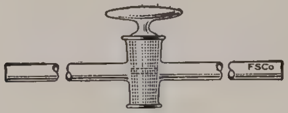
14-545. STOPCOCK, Laboratory, for Gas. Made of brass, nickel-plated and polished; with ⅜-inch standard iron pipe female thread. The connection for rubber tubing is provided with seven (7) serrations to take tubing from ¼ to ½ inch inside diameter. **Each, $1.30**

14-550. STOPCOCK, Laboratory Faucet. Made of brass, nickel-plated and polished, with ⅜-inch standard iron pipe female thread on the inlet, and ¼-inch standard iron pipe female thread on the outlet.

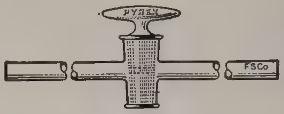
A nickel-plated connector, having a ¼-inch standard iron pipe thread on one end and a tapered connection for ¼-inch rubber tubing on the other end, is supplied with this stopcock. It can be screwed into the outlet thread of this faucet and rubber tubing connected thereto.

Another feature of this faucet is that Filter Pumps No. 9-960 size B, and No. 9-970 sizes B and C, which have a ¼-inch standard iron pipe thread, can be connected directly to the outlet of the faucet, thus eliminating the use of filter pump couplings. Complete with connector. **Each, $4.00**

STOPCOCK, for Gas Bags, see No. 10-980.



14-555



14-560

14-555. STOPCOCKS, Glass, straight; with inlet and outlet tubes of shell tubing. Plugs carefully ground to fit

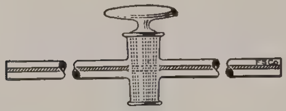
Bore of plug, mm.	1	2	4	5	6
Each	**$ .90**	**1.00**	**1.10**	**1.35**	**1.55**

Dozen lots of a size, 10% discount

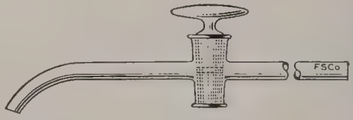
14-560. STOPCOCKS, Pyrex Glass, Straight. The inlet and outlet tubes are shell tubing, and the entire stopcock is made of Pyrex glass.

Bore of plug, mm	2	4
Number in a carton	12	12
Each	**$2.00**	**2.60**

Carton lots, 10% discount



14-565

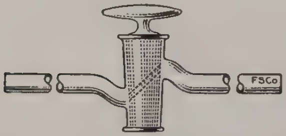


14-570

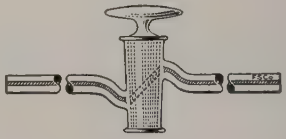
14-565. STOPCOCK, Glass, Capillary, Straight. The inlet and outlet tubes are capillary tubing, having an outside diameter of from 6½ to 7 mm. Used for gas analysis apparatus, etc. Bore of plug, 1½ mm.; the plugs are carefully ground to fit. **Each, $1.25**

14-570. STOPCOCKS, Glass, Curved. Supplied with inlet and outlet tubes of shell tubing; the plugs are carefully ground to fit.

Bore of plug, mm.	2	4
Each	**$1.25**	**1.45**



14-575

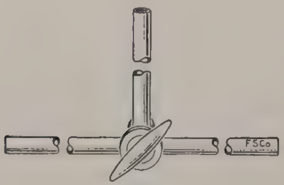


14-580

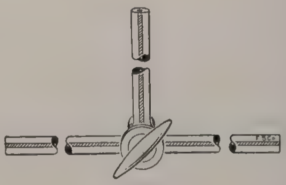
14-575. STOPCOCKS, Glass, Oblique Bore. The inlet and outlet tubes are shell tubing. Plug is bored at an angle.

Bore of plug, mm.	2	4
Each	**$1.25**	**1.45**

14-580. STOPCOCK, Glass, Capillary, Oblique Bore. The inlet and outlet tubes are of capillary tubing, outside diameter, 6½ to 7 mm.; bore of plug, 1½ mm. Plug is bored at an angle. Used for gas analysis apparatus, etc. **Each, $1.40**



14-585

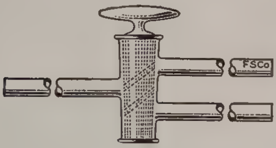


14-590

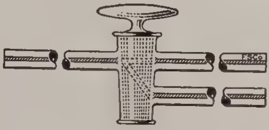
14-585. STOPCOCKS, Glass, Three-Way. Stopcock is "T" shape; the three arms are shell tubing.

Bore of plug, mm	2	4
Each	**$1.45**	**2.50**

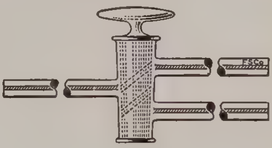
14-590. STOPCOCK, Glass, Capillary, Three-Way; "T" shape with the three arms of capillary tubing; outside diameter, 6½ to 7 mm.; bore of plug, 1½ mm. Used for gas analysis apparatus, gas burettes, etc. **Each, $1.55**



14-595



14-605



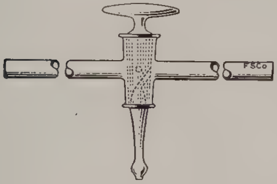
14-600

14-595. STOPCOCKS, Glass, Three-Way. With two tubes on one side; all tubes are shell tubing. The plug has two oblique passages.

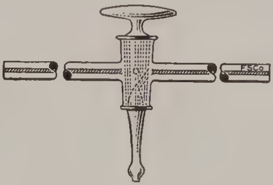
Bore of plug, mm	2	4
Each	$1.50	2.50

14-600. STOPCOCK, Glass, Capillary, Three-Way. Similar to No. 14-595, but with the three tubes of capillary tubing. Outside diameter, 6½ to 7 mm.; bore of plug, 1½ mm. Used for gas burettes, gas pipettes, etc. **Each, $1.60**

14-605. STOPCOCK, Glass, Babb, Three-Way, Capillary. Outside diameter of the three tubes, 6½ to 7 mm.; bore of plug, 1½ mm. The plug is so drilled that a straight passage is made, or the two parallel tubes can be connected to the third tube with the same setting. Used extensively with gas pipettes. **Each, $2.25**



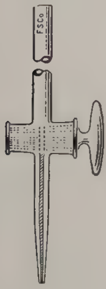
14-610



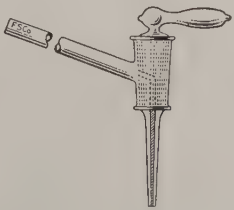
14-615

14-610. STOPCOCK, Glass, Three-Way; with downward outlet at the end of the plug. One bore of the plug connects the horizontal tubes; the other bore connects either horizontal tube with the vertical outlet; bore of plug 2 mm. All connections are shell tubing. **Each, $1.75**

14-615. STOPCOCK, Glass, Three-Way, Capillary. Similar to No. 14-610, but with side tubes of capillary glass, 6½ to 7 mm. outside diameter; bore of plug, 1½ mm. Used for gas manifolds, etc. **Each, $2.00**



14-620



14-625

14-630

14-635

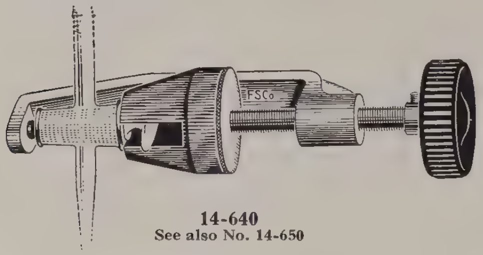
14-620. STOPCOCK, Outlet, Glass, Straight. The inlet connection is shell tubing; the outlet tube is heavy, and is drawn to a point; the bore is 2 mm. diameter. Used for burettes and for making various apparatus. **Each, $1.10**

14-625. STOPCOCK, Outlet, Glass, Angle Form. Inlet connection is shell tubing; the outlet is heavy, and is drawn to a point; the bore is 2 mm. diameter. Used for burettes and for making various apparatus. **Each, $1.50**

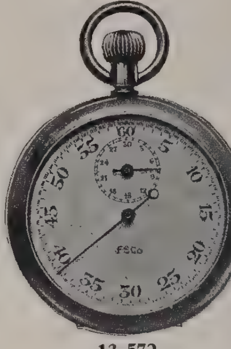
14-630. STOPCOCK, Hard Rubber. Both ends have connections for ¼-inch rubber tubing; bore of plug about 3 mm. Used for acids, H_2S, etc. **Each, $ .75**

14-635. STOPCOCK GREASE, specially prepared for lubricating glass stopcocks and other glass surfaces. Supplied in 1-ounce covered tin boxes. **Per box, $ .35**

Stopcock Remover



14-640
See also No. 14-650



13-572

14-640. STOPCOCK REMOVER, Achessel, Small Size; for removing frozen or stuck stopcock plugs in laboratory glassware. Consists of manganese-bronze frame with Bakelite tip on one end; this tip presses on the lower end of the plug. A phosphor-bronze screw with a vulcanite knob, has a brass swivel plate on the end, to which the four (4) different sized maple wood receptacles can be attached. These receptacles fit over the plug handles, and rest on the shell of the stopcocks.

With the four (4) receptacles supplied, glass plugs having a diameter at the largest end of 5/16 inch to 1/2 inch inclusive, can be removed. Complete with instructions for using. **Each, $5.00**

14-645. RECEPTACLES, for No. 14-640. Extra maple wood receptacles for replacing those supplied with the small Stopcock Remover.

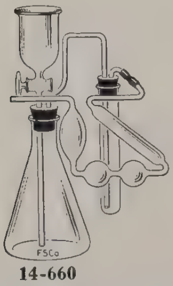
Size No.	1	2	3	4
For plugs, large diameter, inch	5/16	3/8	7/16	1/2
Each	$ .35	.35	.35	.35

14-650. STOPCOCK REMOVER, Achessel, Large Size. This is similar to No. 14-640, but is larger and stronger. Six (6) maple wood receptacles of different size slots are supplied with this instrument. With these receptacles, glass plugs having a diameter at the largest end of 7/16 inch to 3/4 inch inclusive, can be removed. Complete with instructions for using. **Each, $7.50**

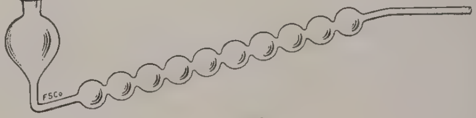
14-655. RECEPTACLES, for No. 14-650. Extra maple wood receptacles for replacing those supplied with the large Stopcock Remover.

Size No.	1	2	3	4	5	6
For plugs, large diameter, inch	7/16	1/2	9/16	5/8	11/16	3/4
Each	$ .35	.35	.35	.35	.35	.35

13-572. STOPWATCH, Non-Magnetic Jeweled Movement. A high grade watch for timing various laboratory operations. With jeweled Swiss movement in nickel case. The split-second hand makes a complete revolution in 60 seconds, and the dial is divided in 1/5-second divisions. Another hand records up to 30 minutes in one complete revolution. The watch is started, stopped, and returned to zero, by pressing the stem. **Each, $13.50**



14-660



14-665

14-660. SULPHUR APPARATUS, Norris; for the determination of sulphur in iron and steel by the evolution method. This apparatus has a 500 ml. Erlenmeyer shaped evolution flask and a charging funnel with stopcock, also a glass trap for the removal of any liquid entrained in the gas stream, and an absorption bulb.

Apparatus is supplied complete with sulphur-free rubber stoppers. **Each, $4.00**

14-665. SULPHUR BULB, Meyer, Glass; for the determination of sulphur by the bromine method and of carbon by the barium hydroxide method. Bulb is about 20 inches long with ten (10) absorption bulbs, each 1 1/4 inches diameter. **Each, $1.80**

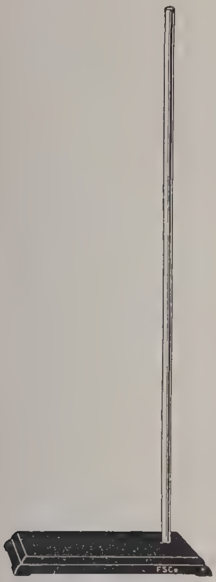
SULPHUR APPARATUS, for the determination of sulphur in oils. See No. 13-560.

SULPHUR BOMB, Parr, Improved Electric; for the determination of sulphur content of coal. See No. 6-740 on page 220.

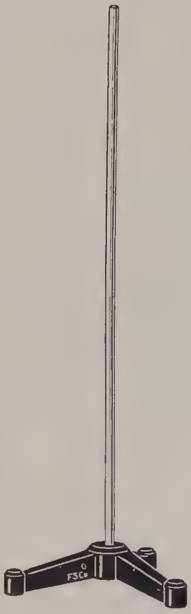
SULPHUR CRUCIBLE, Pennock and Martin; for the determination of sulphur in coal, coke, etc. See No. 8-185 on page 271.

SULPHUR PHOTOMETER, Parr; for the determination of sulphur in coal, oil, food, rubber, etc. See No. 4-480 on page 135.

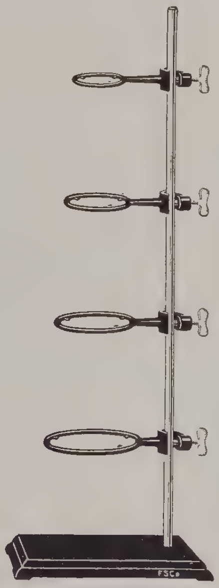
SUPPORTS



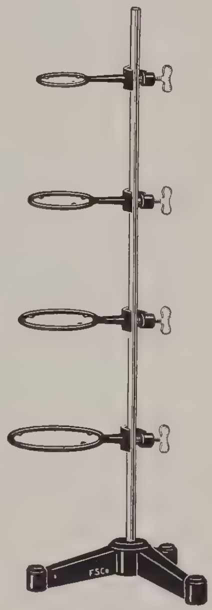
14-670



14-675



14-680



14-685

14-670. SUPPORTS, Apparatus, Rectangular Base. Bases are cast iron protected with baked, black enamel; rods are steel, copper plated.

Size	Small	Medium	Large	Extra Large
Size of base, inches	4 x 6	5 x 8	6 x 9	6½ x 11
Length of rod, inches	18	20	24	36
Diameter of rod, inches	5/16	3/8	7/16	1/2
Each	**$ .55**	**.70**	**1.15**	**1.65**

Dozen lots of a size, 10% discount

14-675. SUPPORTS, Apparatus, Tripod Base. Bases are cast iron protected with baked, black enamel; rods are steel, copper plated.

Size	Small	Medium	Large	Extra Large
Length of rod, inches	18	20	24	36
Diameter of rod, inches	5/16	3/8	7/16	1/2
Each	**$ .65**	**.80**	**1.30**	**2.35**

Dozen lots of a size, 10% discount

14-680. SUPPORTS, Rectangular, with Rings. No. 14-670 Supports with detachable cast-iron, black enameled rings, which are held by screw clamps.

Size	Small	Medium	Large	Extra Large
Number of rings	2	3	4	4
Outside diameter of rings, inches	2, 3	2, 3, 4	2, 3, 4, 5	3, 4, 5, 6
Each	**$ .95**	**1.30**	**2.00**	**2.50**

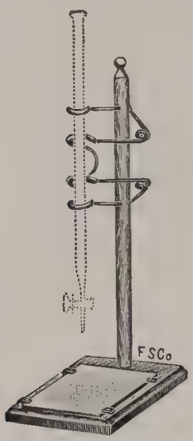
Dozen lots of a size, 10% discount

14-685. SUPPORTS, Tripod, with Rings. No. 14-675 Supports with detachable cast-iron, black enameled rings, which are held by screw clamps.

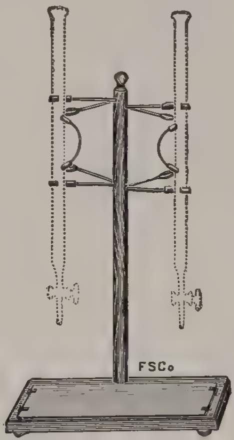
Size	Small	Medium	Large	Extra Large
Number of rings	2	3	4	4
Outside diameter of rings, inches	2, 3	2, 3, 4	2, 3, 4, 5	3, 4, 5, 6
Each	**$1.10**	**1.50**	**2.25**	**3.30**

Dozen lots of a size, 10% discount

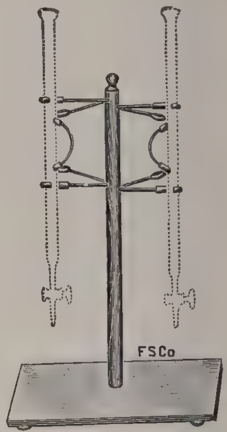
Supports



14-690



14-695



14-705

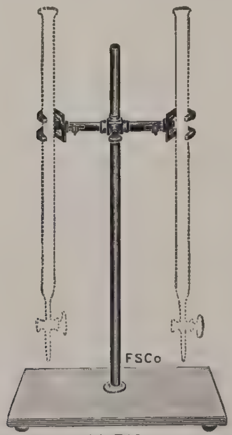
14-690. SUPPORT, Burette, Chaddock, Single. Wooden base covered with opalite glass plate; wooden post with rubber covered wire clamp, permanently attached. The burette is held in two places, by the spring tension of the wire clamp. The burette is conveniently attached or removed by relieving the tension of the spring. **Each, $2.25**

14-695. SUPPORT, Burette, Chaddock, Double. Wooden base covered with opalite glass plate; wooden post with wire clamp for two burettes, permanently attached. The wire clamp is rubber covered, and holds the burettes by the tension of the spring. Burettes are conveniently attached or removed by relieving the tension of the springs. **Each, $3.25**

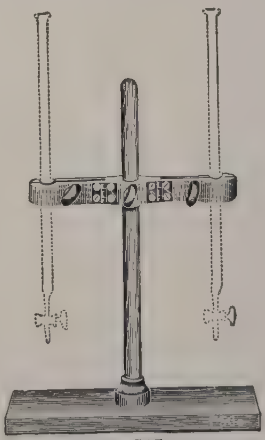
14-700. GLASS PLATES, for Chaddock Supports No. 14-690 and No. 14-695. Readily replaced on the top of the wooden bases.

Size	A	B
For support	Single	Double
Each	**$ .60**	**.75**

14-705. SUPPORT, Burette, Chaddock, Double, Opalite Base. Similar to No. 14-695 excepting the base which is heavy, opalite, milk-white glass, highly polished. This is the cleanest kind of a base, and is also the most resistant to the action of chemicals. **Each, $6.50**



14-710

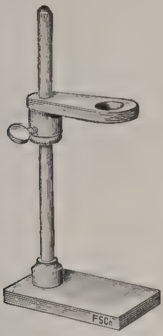


14-715

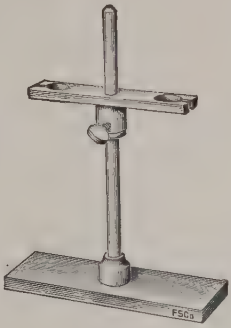
14-710. SUPPORT, Burette, Allihn, Double. Supplied with opalite, milk-white glass base, highly polished; very clean and chemical resistant. The support rod is nickel-plated. The holder is adjustable for height and has two clamps for burettes; the burettes are held by spring tension, and are conveniently attached or removed by compressing the spring by means of the attachment for this purpose. **Each, $9.50**

14-715. SUPPORT, Burette, Double, Wooden Clamp. Supplied with wooden base and post, with adjustable wooden holder for two burettes. The clamps for the burettes are cork lined, and one jaw of each clamp is hinged; the jaws are opened or closed by wooden screws. **Each, $1.75**

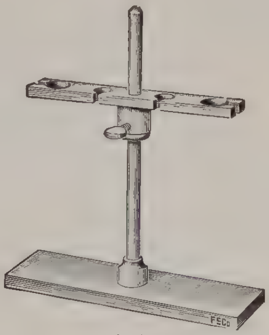
SUPPORTS, Condenser; see Supports No. 14-670 and No. 14-675, also Clamps No. 5-740 to No. 5-750.



14-720



14-725

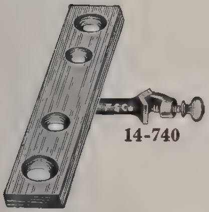


14-730

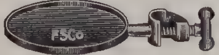
14-720. SUPPORT, Funnel, for one (1) funnel. Made entirely of wood with adjustable holder with wide shelf to hold the funnel, and to accommodate a beaker. **Each, $1.10**

14-725. SUPPORT, Funnel, for two (2) funnels. Made entirely of wood with adjustable holder; the openings for the funnels are slotted so that funnels can be placed or removed from the front. **Each, $ .95**

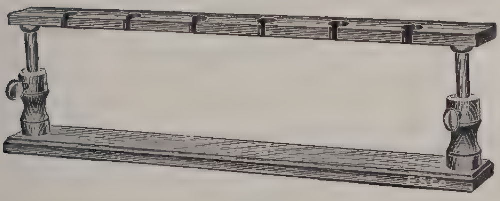
14-730. SUPPORT, Funnel, for four (4) funnels. Made entirely of wood with adjustable holder. The openings for the funnels are slotted so that the funnels can be placed or removed without lifting them over the top of the holder. **Each, $1.20**



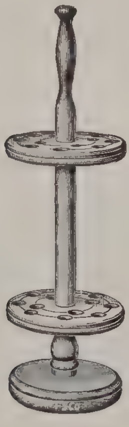
14-740



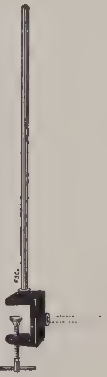
14-750



14-735



14-745



14-752

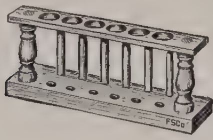
14-735. SUPPORT, Funnel, for six (6) funnels. Made entirely of wood with adjustable holder. In this style there are no posts projecting above the holder, leaving the space clear for the funnels and for washing. The openings for the funnels are slotted so that the funnels can be placed or removed without lifting them over the top of the holder. **Each, $3.50**

14-740. SUPPORT ARM, for four (4) funnels; with metal clamp for attaching to the iron rod of any of the usual apparatus supports. **Each, $ .70**

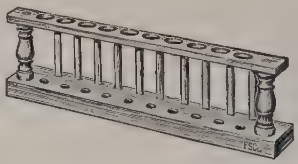
14-745. SUPPORT, Pipette, Revolving. Made entirely of wood; to hold twelve (12) pipettes........ **Each, $3.25**

14-750. SUPPORT PLATE. Made of cast iron, 5 inches diameter, with clamp for attaching to the iron rod of the usual support. The plate has a $\frac{3}{16}$-inch ledge, which prevents the supported article from sliding off. Can also be used as a hot plate. **Each, $ .60**

14-752. SUPPORT, Table; with $\frac{3}{8}$-inch coppered steel rod 20 inches long, which can be placed vertically or horizontally without removing cast-iron clamp from table. **Each, $1.00**



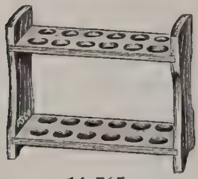
14-755



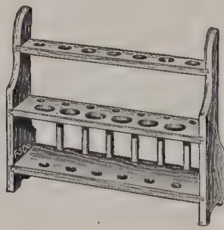
14-760

14-755. SUPPORT, Test Tube, for six (6) tubes; with six (6) drying pins; with heavy wooden base. The openings are 24 mm. diameter. **Each, $ .50**

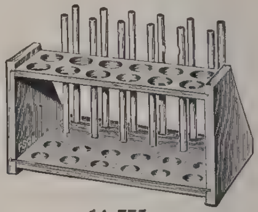
14-760. SUPPORT, Test Tube, for ten (10) tubes; with ten (10) drying pins; with heavy wooden base. The openings are 24 mm. diameter. **Each, $ .65**



14-765



14-770

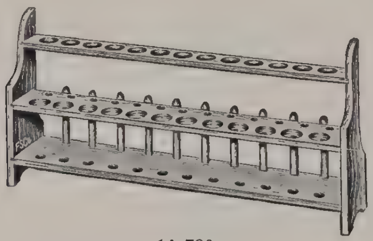


14-775

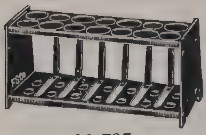
14-765. SUPPORT, Test Tube, for twelve (12) tubes in two rows; without drying pins. The openings are 22 mm. diameter. **Each, $ .55**

14-770. SUPPORT, Test Tube, for thirteen (13) tubes in two shelves; with six (6) drying pins. The upper shelf has 7 openings, 20 mm. diameter; the lower shelf has 6 openings, 26 mm. diameter. **Each, $ .75**

14-775. SUPPORT, Test Tube, for twelve (12) large tubes; with twelve (12) long drying pins. The openings are 28 mm. diameter. **Each, $1.10**



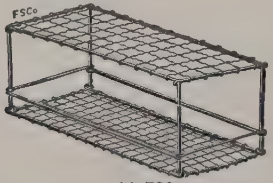
14-780



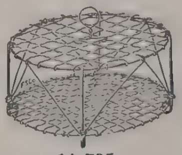
14-785

14-780. SUPPORT, Test Tube, for twenty-five (25) tubes in two shelves; with ten (10) drying pins. The upper shelf has 13 openings, 24 mm. diameter; the lower shelf has 12 openings, 26 mm. diameter. **Each, $1.25**

14-785. SUPPORT, Test Tube, Stamped Steel, for fourteen (14) tubes; with six (6) drying pins. With 7 holes each 22 mm. diameter, and 7 holes each 27 mm. diameter. Support is completely protected with black enamel. **Each, $ .65**



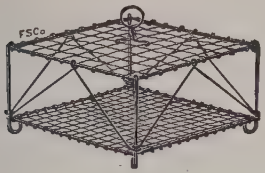
14-790



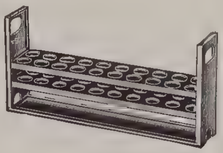
14-795

14-790. SUPPORT, Test Tube, Dipped Galvanized Wire. Holds forty (40) test tubes of diameters up to ¾ inch. Length, 10½ inches; width, 4½ inches; height, 3½ inches. **Each, $1.30**

14-795. SUPPORT, Test Tube, Round, Dipped Galvanized Wire. Holds forty-five (45) test tubes of diameters up to ¾ inch. Diameter, 7½ inches; height, 3½ inches; with wire handle in the center for carrying. **Each, $1.30**



14-800

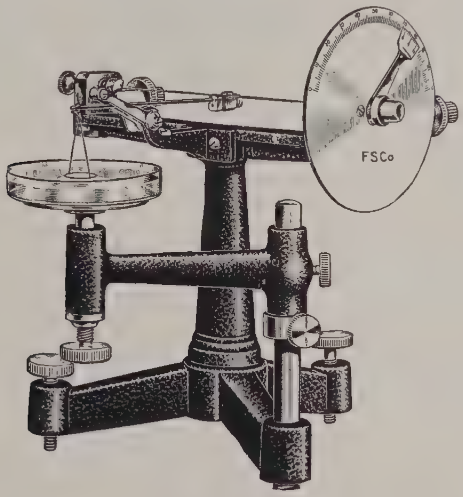


14-805

14-800. SUPPORT, Test Tube, Square, Dipped Galvanized Wire. Holds forty-nine (49) test tubes of diameters up to ¾ inch. Dimensions, 7¼ x 7¼ inches; height, 3½ inches; with wire handle in the center for carrying. **Each, $1.30**

WIRE BASKETS, for Test Tubes, see Test Tube Baskets, page 545.

14-805. SUPPORT, for Wassermann Tubes. Made of polished copper, 10¼ inches long, 2 inches wide; height of sides, 4½ inches. There are 20 holes, each 16 mm. diameter, and each pair of holes is numbered from 1 to 10. The support is heavy, and the center of gravity is low so that it is not easily tipped. **Each, $3.25**



14-810
See also No. 14-815

14-810. SURFACE TENSION APPARATUS, du Noüy Direct Reading Tensiometer with Dyne Scale. This apparatus is a surface tension balance of the torsion type, and is used for the determination of the surface tension of liquids, and particularly colloids, by the ring method (see *Science Progress, IX, 428* [*1915*]). With this apparatus, determinations can be made in 15 to 30 seconds, and results checked repeatedly, even though only one milliliter (1 ml.) of liquids is available for the tests.

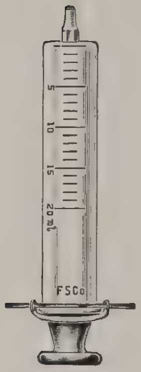
The platinum dip ring is supported at the end of a long lever arm which is clamped at the middle of a stretched steel wire. As the wire is rotated, the ring is raised from the surface of the liquid until it breaks away from it and just overcomes the surface tension. The reading on the dial is then the surface tension of the liquid in dynes per centimeter. The scale has a range of 100 dynes, and by means of the vernier can be read to 0.1 dyne and estimated to 0.05 dyne. By adjusting the length of the torsion arm, the instrument may be standardized against any liquid whose surface tension at some particular temperature is known; the scale then indicates dynes per centimeter for the subsequent measurements. The platform for supporting the liquid container is adjustable for height by means of a collar on the supporting rod. A micrometer adjustment directly below the platform, permits of the finer adjustment. The apparatus is mounted on a heavy tripod support provided with leveling screws, and is supplied in a hardwood carrying case.

du Noüy Tensiometer with dyne scale, as described with certified platinum ring, in hardwood carrying case, and with directions for use. **Each, $100.00**

14-815. SURFACE TENSION APPARATUS, du Noüy Direct Reading Tensiometer with Angular Degree Scale. This apparatus is similar to the No. 14-810 Tensiometer, but has the scale calibrated in angular degrees from which the surface tension may be obtained by calculation.

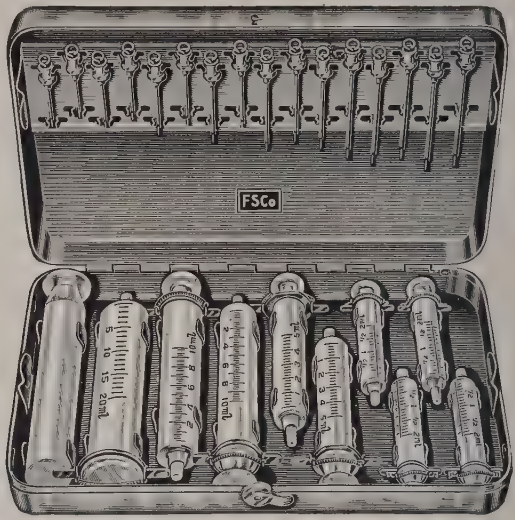
du Noüy Tensiometer with angular degree scale, with certified platinum ring, in hardwood carrying case, and with directions for use. **Each, $60.00**

SYRINGES



14-820

14-825
See also No. 14-830



14-835

SYPHONS, Glass. Any size or style will be made to order in our Glass Blowing Shop. Send sketch with dimensions.

14-820. SYRINGES, Genuine Luer. These are universally considered to be the most satisfactory type of all-glass syringes. The glass is thoroughly annealed, permitting sterilization by boiling. The barrel and the plunger are perfectly ground, preventing back-flow during injections. These syringes are equipped with a spring holder which automatically holds the plunger at any point of graduation, and also prevents the plunger from falling out, but permits the withdrawal of the plunger for cleaning. The syringes are accurately graduated; the 1 ml. and 2 ml. sizes are graduated in minims as well as milliliters; the other sizes are graduated in milliliters. The 1 ml. syringe is for tuberculin use, and has a blue glass plunger. Each syringe is packed in a pasteboard box and is supplied **without needles,** which are listed separately.

Capacity, ml	1	2	5	10	20	30	50
Smallest subdivisions, ml	1/100	1/10	⅕	⅕	1	1	5
Each	**$1.75**	**1.25**	**2.00**	**2.50**	**3.00**	**4.00**	**6.00**

14-825. NEEDLES, Slip-On Type, Steel, for No. 14-820 Syringes. These needles are made of seamless, high carbon, tempered steel; the points are hand finished with a smooth cutting edge. These needles are made with nickel-plated slip joints which fit all sizes of No. 14-820 Luer Syringes. Each needle is supplied with a wire having a ring handle. This wire fits into the needle, prevents the needle from becoming clogged, and is also used for cleaning. Supplied in pasteboard boxes containing one (1) dozen each. The needles are held in place in the box by clips which are on a piece of corrugated sheet metal. Needles are protected from dust and rust, by glassine paper.

Gauge, B. & S.	25	24	22	20	20	18
Length, inches	⅝	1	1¼	1½	2	2
Per dozen	**$1.75**	**1.75**	**2.25**	**2.25**	**2.25**	**2.75**

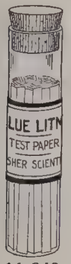
14-830. NEEDLE, Spinal Puncture. Made of seamless steel, length of needle part, 3 inches; thicknes of needle, No. 18 B. & S. gauge. Made with nickel-plated slip-joints which fit all sizes of No. 14-820 Luer Syringes. The needle is supplied with a wire having a nickel-plated knob; this fits into the needle, prevents it from becoming clogged, and is also used for cleaning. **Each, $ .80**
Per dozen, $8.00

14-835. SYRINGE SET, Genuine Luer, as used by the U. S. Navy Medical Department. Set of nine (9) syringes and 16 assorted needles; fitted in a nickel-plated metal case. The set consists of the following:

1 Luer Syringe, 20 ml. graduated in 1 ml.
2 Luer Syringes, 10 ml. graduated in ⅕ ml.
2 Luer Syringes, 5 ml. graduated in ⅕ ml.
4 Luer Syringes, 2 ml. graduated in 1/10 and minims.
2 Needles, 23 gauge, ¾ inch long.
3 Needles, 21 gauge, 1 inch long.
2 Needles, 20 gauge, 1½ inches long.
3 Needles, 23 gauge, 1 inch long.
2 Needles, 21 gauge, 1¼ inches long.
2 Needles, 20 gauge, 1¾ inches long.
2 Needles, 18 gauge, 2 inches long.

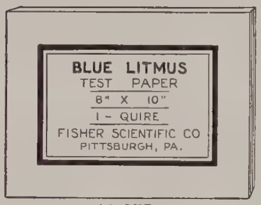
This set is a complete assortment in a convenient and portable case, and contains the syringes and needles which might be required for most any purpose Any part of the set can be replaced. **Per set, $30.00**

TEST PAPERS



14-840

14-865



14-875

VIALS

14-840. TEST PAPER, Litmus, Blue, in vials. Each vial contains 100 strips. This paper turns red in the presence of acids.
Per vial, $ .10
Per dozen vials, $1.00

14-845. TEST PAPER, Litmus, Red, in vials. Each vial contains 100 strips. This Paper turns blue in the presence of alkalies.
Per vial $ .10
Per dozen vials, $1.00

14-850. TEST PAPER, Litmus, Neutral, in vials. Each vial contains 100 strips. This paper turns red in the presence of acids, and blue in the presence of alkalies.
Per vial, $ .10
Per dozen vials, $1.00

14-855. TEST PAPER, Tumeric, in vials. Each vial contains 100 strips. This paper turns brown in the presence of alkalies. Its color is restored by acids, except boric which turns it to reddish brown changing to bluish-black on the addition of ammonia.
Per vial, $ .15
Per dozen vials, $1.50

14-860. TEST PAPER, Potassium Iodide-Starch, in vials. Each vial contains 100 strips. This paper turns blue in the presence of free iodine.
Per vial $ .15
Per dozen vials, $1.50

BOOKS

14-865. TEST PAPER, Litmus, Blue, in books of 25 strips which are perforated to facilitate removal.
Per book, $ .06
Per dozen books, $ .60

14-870. TEST PAPER, Litmus, Red, in books of 25 strips which are perforated to facilitate removal.
Per book, $ .06
Per dozen books, $ .60

SHEETS

14-875. TEST PAPER, Litmus, Blue, in sheets 8x10 inches .... **Per sheet, $ .10**
Per quire, $ .90

14-880. TEST PAPER, Litmus, Red, in sheets 8x10 inches .... **Per sheet, $ .10**
Per quire, $ .90

14-885. TEST PAPER, Litmus, Neutral, in sheets 8x10 inches .... **Per sheet, $ .10**
Per quire, $ .90

14-890. TEST PAPER, Congo Red, in sheets 8x10 inches. This paper turns blue in the presence of acids, and red in neutral or alkaline solutions. This is not recommended for use with relatively weak acids like acetic acid.
Per sheet, $ .10
Per quire, $ .90

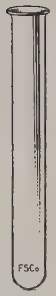
14-895. TEST PAPER, Phenolphthalein, in sheets 8x10 inches. This paper turns red in the presence of alkalies; it has a sharper end point than litmus paper.
Per sheet, $ .12
Per quire, $1.20

14-900. TEST PAPER, Potassium Iodide-Starch, in sheets 8x10 inches .... **Per sheet, $ .12**
Per quire, $1.20

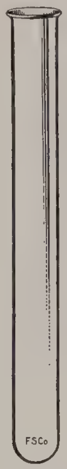
14-905. TEST PAPER, Tumeric, in sheets 8x10 inches .... **Per sheet, $ .12**
Per quire, $1.20

14-910. TEST PAPER, Lead Acetate, in sheets 8x10 inches. This paper turns black in the presence of inorganic sulphides.
Per sheet, $ .10
Per quire, $ .90

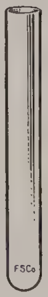
TEST TUBES



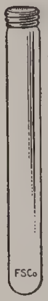
14-915



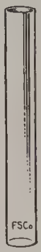
14-920



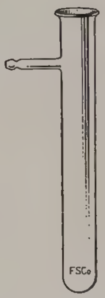
14-925



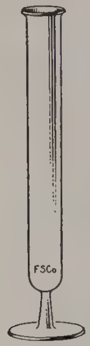
14-930



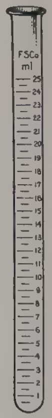
14-935



14-940



14-945



14-950

14-915. TEST TUBES, Chemical, light weight, flared top; round bottom, flint glass, free from lead, well annealed.

*Length, inches	3	4	5	6	6	6	7	8	10
Outside diameter, in.	⅜	½	⅝	⅝	¾	1	⅞	1	1
Per dozen	**$ .22**	**.25**	**.30**	**.35**	**.40**	**.55**	**.65**	**.75**	**1.25**
Per gross	**$1.65**	**1.90**	**2.50**	**2.80**	**3.10**	**4.20**	**5.00**	**6.75**	**11.50**

14-920. TEST TUBES, Special, heavy weight, flared top; free from lead, well annealed. Withstand hard usage; used extensively for routine, iron, and steel analysis. Size, 10 inches long by 1 inch outside diameter.

Per dozen, $ 1.50
Per gross, $15.00

14-925. TEST TUBES, Bacteriological, heavy weight, without flare; round bottom. Used extensively for making cultures; sometimes called "Board of Health Tubes."

*Length, inches	1¾	3	4	5	6	6	7	8
Outside diameter, inches	⅜	⅜	½	⅝	⅝	¾	⅞	1
Per dozen	**$ .30**	**.25**	**.30**	**.40**	**.40**	**.45**	**.70**	**.95**
Per gross	**$2.60**	**2.10**	**2.25**	**3.10**	**3.40**	**3.75**	**5.75**	**8.10**

14-930. TEST TUBES, Metal Cap, for bacteriological work. A new culture test tube, in which media and cultures may be preserved for a considerable period of time. It has a screw metal cap, with a cork insert which seals the tube tightly and prevents the culture from drying, which is so common in the cotton-plugged culture tube.

Length, inches	5	6
Outside diameter, inches	⅝	¾
Per dozen	**$ .65**	**.75**
Per gross	**$6.00**	**7.00**

14-935. TEST TUBES, Flat Bottom, without flare. So-called "specimen tubes."

Length, inches	4	5	8
Outside diameter, inches	½	⅝	1
Per dozen	**$ .25**	**.30**	**.75**
Per gross	**$2.00**	**2.60**	**7.15**

14-940. TEST TUBES, with side tube; flared top, round bottom. The side tubes are shaped to hold rubber tubing.

*Length, inches	5	6	8
Outside diameter, inches	⅝	¾	1
Each	**$ .10**	**.13**	**.18**

Dozen lots of a size, 10% discount

14-945. TEST TUBES, on foot; flared top. The bases are blown glass.

*Length of tube, without base, inches	5	6	8
Outside diameter, inches	⅝	¾	1
Each	**$ .16**	**.20**	**.25**

Dozen lots of a size, 10% discount

14-950. TEST TUBES, Graduated; flared top, round bottom.

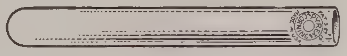
*Capacity, ml	10	25
Subdivisions, ml	⅒	½
Each	**$ .40**	**.50**

Dozen lots of a size, 10% discount

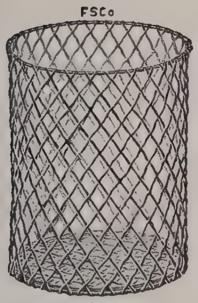
**Sizes recommended by the American Chemical Society, Standardization Committee.*

14-955

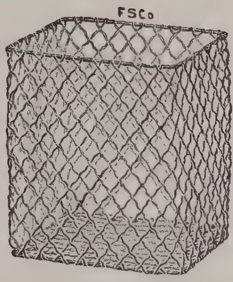
14-980



14-960



14-965



14-970

14-975

14-955. TEST TUBES, Chemical, Pyrex Glass, light wall, **with flared top,** round bottom. These tubes are recommended for use where it is required to heat to a high temperature. They are recommended for their mechanical strength, and low coefficient of expansion.

*Length, mm	75	100	125	150	150	175	200	250
Outside diameter, mm	10	13	15	16	18	22	25	25
Number of tubes in a carton	200	150	100	150	150	100	50	100
Number of cartons in a case	8	8	14	10	10	4	10	4
Each	**$.05**	**.06**	**.08**	**.10**	**.11**	**.13**	**.25**	**.36**

Carton lots, 10% discount
Case lots, 10 and 10% discount

14-960. TEST TUBES, Ignition, Pyrex Glass, heavy wall; without flare, round bottom. Pyrex glass does not soften below 800°C.; it also has a low coefficient of expansion. These properties make it the most satisfactory glass for ignitions.

*Length, mm	100	125	150	200
Outside diameter, mm	14	16	20	25
Number of tubes in a carton	150	100	100	50
Number of cartons in a case	8	14	10	10
Each	**$ .10**	**.12**	**.20**	**.30**

Carton lots, 10% discount
Case lots, 10 and 10% discount

14-965. TEST TUBE BASKETS, Circular, dipped galvanized wire; for use in incubators and sterilizers.

Diameter, inches	5	10
Height, inches	6	6
Each	**$1.10**	**1.65**

14-970. TEST TUBE BASKETS, Rectangular, dipped galvanized wire.

Length, inches	5	5	10
Width, inches	4	4	6
Height, inches	4	6	6
Each	**$1.10**	**1.25**	**1.60**

14-975. TEST TUBE CAN, for storing culture media and sterile tubes. Outside height with lid, 7 inches; inside diameter, 5 inches. Made of tin plate, japanned on the outside with the exception of the bottom. The tight fitting cover is dust-proof. A card holder on the side, provides a convenient means for marking.

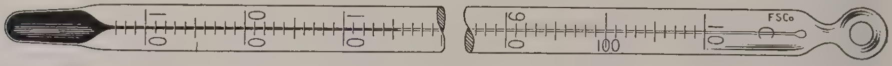
Each, $ .50
Dozen lots, 10% discount

14-980. TEST TUBE CAPS, Rubber. Made of pure soft rubber with rolled edges; used to cover the tops of test tubes. Top diameter, 1 inch; will fit flared top test tubes from ½ to ¾ inch outside diameter, and test tubes without flared top from ½ to 1 inch outside diameter.

Each, $ .15
Per dozen, $1.35

**Sizes recommended by the American Chemical Society, Standardization Committee.*

THERMOMETERS



14-985

TEMPERATURE CONVERSION TABLE

Compiled by Dr. Albert Sauveur

The numbers in italics in the center column refer to the temperature either in Centigrade or Fahrenheit, which one desires to convert to the other scale. If converting Fahrenheit to Centigrade, the equivalent temperature will be found in the left column. If converting Centigrade to Fahrenheit, the equivalent temperature will be found in the column on the right.

−100 to 24			25 to 60			61 to 95			96 to 340			350 to 690			700 to 1000		
C.		F.	C.		F.	C.		F.	C.		F.	C.		F.	C.		F.
−73	−*100*	−148	−3.9	*25*	77.0	16.1	*61*	141.8	35.5	*96*	204.8	177	*350*	662	371	*700*	1292
−68	−*90*	−130	−3.3	*26*	78.8	16.6	*62*	143.6	36.1	*97*	206.6	182	*360*	680	376	*710*	1310
−62	−*80*	−112	−2.8	*27*	80.6	17.1	*63*	145.4	36.6	*98*	208.4	188	*370*	698	382	*720*	1328
−57	−*70*	−94	−2.2	*28*	82.4	17.7	*64*	147.2	37.1	*99*	210.2	193	*380*	716	387	*730*	1346
−51	−*60*	−76	−1.6	*29*	84.2	18.2	*65*	149.0	37.7	*100*	212.0	199	*390*	734	393	*740*	1364
−46	−*50*	−58	−1.1	*30*	86.0	18.8	*66*	150.8	38	*100*	212	204	*400*	752	399	*750*	1382
−40	−*40*	−40	−.6	*31*	87.8	19.3	*67*	152.6	43	*110*	230	210	*410*	770	404	*760*	1400
−34	−*30*	−22	0	*32*	89.6	19.9	*68*	154.4	49	*120*	248	215	*420*	788	410	*770*	1418
−29	−*20*	−4	.5	*33*	91.4	20.4	*69*	156.2	54	*130*	266	221	*430*	806	415	*780*	1436
−23	−*10*	14	1.1	*34*	93.2	21.0	*70*	158.0	60	*140*	284	226	*440*	824	421	*790*	1454
−17.7	*0*	32	1.6	*35*	95.0	21.5	*71*	159.8	65	*150*	302	232	*450*	842	426	*800*	1472
−17.2	*1*	33.8	2.2	*36*	96.8	22.2	*72*	161.6	71	*160*	320	238	*460*	860	432	*810*	1490
−16.6	*2*	35.6	2.7	*37*	98.6	22.7	*73*	163.4	76	*170*	338	243	*470*	878	438	*820*	1508
−16.1	*3*	37.4	3.3	*38*	100.4	23.3	*74*	165.2	83	*180*	356	249	*480*	896	443	*830*	1526
−15.5	*4*	39.2	3.8	*39*	102.2	23.8	*75*	167.0	88	*190*	374	254	*490*	914	449	*840*	1544
−15.0	*5*	41.0	4.4	*40*	104.0	24.4	*76*	168.8	93	*200*	392	260	*500*	932	454	*850*	1562
−14.4	*6*	42.8	4.9	*41*	105.8	25.0	*77*	170.6	99	*210*	410	265	*510*	950	460	*860*	1580
−13.9	*7*	44.6	5.5	*42*	107.6	25.5	*78*	172.4	100	*212*	413	271	*520*	968	465	*870*	1598
−13.3	*8*	46.4	6.0	*43*	109.4	26.2	*79*	174.2	104	*220*	428	276	*530*	986	471	*880*	1616
−12.7	*9*	48.2	6.6	*44*	111.2	26.8	*80*	176.0	110	*230*	446	282	*540*	1004	476	*890*	1634
−12.2	*10*	50.0	7.1	*45*	113.0	27.3	*81*	177.8	115	*240*	464	288	*550*	1022	482	*900*	1652
−11.6	*11*	51.8	7.7	*46*	114.8	27.7	*82*	179.6	121	*250*	482	293	*560*	1040	487	*910*	1670
−11.1	*12*	53.6	8.2	*47*	116.6	28.2	*83*	181.4	127	*260*	500	299	*570*	1058	493	*920*	1688
−10.5	*13*	55.4	8.8	*48*	118.4	28.8	*84*	183.2	132	*270*	518	304	*580*	1076	498	*930*	1706
−10.0	*14*	57.2	9.3	*49*	120.2	29.3	*85*	185.0	138	*280*	536	310	*590*	1094	504	*940*	1724
−9.4	*15*	59.0	9.9	*50*	122.0	29.9	*86*	186.8	143	*290*	554	315	*600*	1112	510	*950*	1742
−8.8	*16*	61.8	10.4	*51*	123.8	30.4	*87*	188.6	149	*300*	572	321	*610*	1130	515	*960*	1760
−8.3	*17*	63.6	11.1	*52*	125.6	31.0	*88*	190.4	154	*310*	590	326	*620*	1148	520	*970*	1778
−7.7	*18*	65.4	11.5	*53*	127.4	31.5	*89*	192.2	160	*320*	608	332	*630*	1166	526	*980*	1796
−7.2	*19*	67.2	12.1	*54*	129.2	32.1	*90*	194.0	165	*330*	626	338	*640*	1184	532	*990*	1814
−6.6	*20*	68.0	12.6	*55*	131.0	32.6	*91*	195.8	171	*340*	644	343	*650*	1202	538	*1000*	1832
−6.1	*21*	69.8	13.2	*56*	132.8	33.3	*92*	197.6				349	*660*	1220			
−5.5	*22*	71.6	13.7	*57*	134.6	33.8	*93*	199.4				354	*670*	1238			
−5.0	*23*	73.4	14.3	*58*	136.4	34.4	*94*	201.2				360	*680*	1256			
−4.4	*24*	75.2	14.8	*59*	138.2	34.9	*95*	203.0				365	*690*	1274			
			15.6	*60*	140.0												

14-985. THERMOMETERS, Engraved Stem, Centigrade. Made of normal glass thermometer tubing with milk-white glass back and ring at the top for suspending; calibrated for total immersion. The diameters are from 6 to 7 mm., and fit the holes of F. S. Co. Rubber Stoppers. Thermometer reading to 360° C. is **nitrogen filled** which is a necessary requirement of a thermometer of this range.

Range, degrees C.	−10 to 110	−10 to 150	0 to 200	0 to 250	*0 to 360
Subdivisions, degrees	1	1	1	1	1
Length, mm.	300	300	350	350	375
Each	**$1.10**	**1.25**	**1.35**	**1.50**	**1.75**

Dozen lots of one range, 10% discount

**Thermometer, range 360° C., is nitrogen filled.*

15-020

See also No. 15-015 and No. 15-025

14-990. THERMOMETERS, Engraved Stem, Fahrenheit. Similar to No. 14-985, but graduated in degrees Fahrenheit. Thermometer reading 600° F. is **nitrogen filled,** which is a necessary requirement of a thermometer of this range.

Range, degrees F	0 to 220	30 to 300	30 to 400	*30 to 600
Subdivisions, degrees	2	2	2	2
Length, inches	12	12	14	15
Each	**$1.10**	**1.25**	**1.35**	**1.75**

Dozen lots of one range, 10% discount

**Thermometer, range 600° F. is nitrogen filled.*

14-995. THERMOMETERS, Engraved Stem, Centigrade and Fahrenheit. Similar to No. 14-985 but with both Centigrade and Fahrenheit scales. Thermometer reading 360° C. is **nitrogen filled.**

Range, degrees C	−10 to 110	0 to 200	0 to 360
Range, degrees F	0 to 220	30 to 400	30 to 680
Length, inches	12	14	15
Each	**$1.50**	**1.80**	**2.25**

Dozen lots of one range, 10% discount

15-000. THERMOMETERS, Engraved Stem, Fractional Degrees, Centigrade. Engraved on the stem, with milk-white glass background, with glass ring at the top for suspending the thermometer. Calibrated for total immersion.

Range, degrees C	0 to 50	0 to 100	0 to 200	0 to 250
Subdivisions, degrees	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$
Length, mm	400	600	600	400
Each	**$4.75**	**6.25**	**6.25**	**4.75**

15-005. THERMOMETERS, Enclosed White-Glass Scale, Centigrade. The scale of this style thermometer is milk-white glass with black graduations and numbers; this scale is completely enclosed and does not come in contact with the liquid. The diameters are from 8 to 10 mm. Thermometer reading 360° C. is **nitrogen filled.**

Range, degrees C	−10 to 110	0 to 200	0 to 360
Subdivisions, degrees	1	1	1
Length, mm	300	350	400
Each	**$1.60**	**1.80**	**2.50**

Dozen lots of one range, 10% discount

15-010. THERMOMETERS, Enclosed White-Glass Scale, Fahrenheit. Similar to No. 15-005, but graduated in degrees Fahrenheit.

Range, degrees F	0 to 220	0 to 400
Subdivisions, degrees	2	2
Length, inches	12	14
Each	**$1.60**	**1.80**

Dozen lots of one range, 10% discount

15-015. THERMOMETERS, High Temperature, Nitrogen Filled. Made of the most refractory borosilicate glass with white background; engraved on the stem. While some thermometers are calibrated above 500° C. and 930° F., these are the highest temperatures at which they should be used, as the combination of the high temperatures and the internal pressure causes permanent deformation at higher temperatures. Thermometers for use up to 500° C. and 930° F. are sealed at the top, above the expansion bulb, with metallic antimony. This is an approved and most satisfactory method of sealing-off the high nitrogen pressure. This metallic antimony should not be mistaken for part of the mercury column.

The 400° C. and 750° F. thermometers have glass rings on the top; the 500° C. and 930° F. thermometers do not have glass rings on the top.

Range, degrees	0 to 400 C.	0 to 500 C.	30 to 750 F.	30 to 930 F.
Subdivisions, degrees	1	1	2	2
Each	**$4.75**	**8.00**	**4.75**	**8.00**

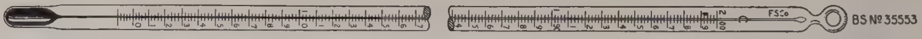
15-020. THERMOMETERS, Armored, Nitrogen Filled. These are No. 15-015 Thermometers fitted in nickel-plated seamless steel cases with cap and ring at the top. The armored cases protect the thermometers from breakage in use and in handling, and are recommended for all industrial purposes and for laboratory purposes where the metal case does not interfere with its use. See No. 15-015 for description of thermometers and their use.

Range, degrees	0 to 400 C.	0 to 500 C.	30 to 750 F.	30 to 930 F.
Subdivisions, degrees	1	1	2	2
Each	**$6.75**	**10.25**	**6.75**	**10.25**

15-025. ARMOR CASES, for protecting thermometers. Made of seamless steel nickel-plated, with screw cap with ring at the top. Similar to the case supplied with No. 15-020 Thermometers. The case should be longer than the thermometer to permit asbestos wool to be used for packing. Can be used with Engraved Stem Thermometers No. 14-985, No. 14-990, No. 14-995, No. 15-000, and No. 15-015.

Length of case, inches	13	14	15	16	18	20	25
Each	**$1.75**	**1.85**	**1.95**	**2.10**	**2.25**	**2.50**	**2.75**

Thermometers



15-040
See also No. 15-043

15-030. THERMOMETER, Low Temperature, Alcohol Filled. Range, −50 to +50° C., subdivided in 1° divisions; engraved on the stem. The alcohol is dyed red to facilitate the reading; length, about 300 mm. **Each, $4.00**

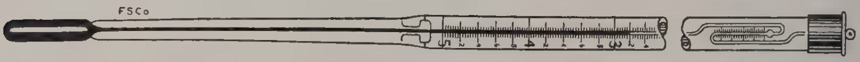
15-035. THERMOMETER, Low Temperature, Toluol Filled. Range, −100 to +50° C., subdivided in 1° divisions; engraved on the stem. The toluol is dyed red to facilitate the reading; length, about 350 mm. **Each, $10.00**

15-040. THERMOMETERS, Precision, U. S. Bureau of Standards Certified, Centigrade. These thermometers comply with the requirements of the United States Bureau of Standards as described in *Circular No. 8 (3rd. Edition) Aug., 1921.* Each thermometer has been tested at five different points by the Bureau, and their certificate is supplied with the thermometer. Calibrated for total immersion; The Bureau's Certificate gives the rule for applying the stem correction for different depths of immersion.

Range, degrees C.	0 to 50	0 to 100	0 to 200	0 to 250	0 to 360
Subdivisions, degrees	⅒	⅒	⅕	½	1
Length, mm.	400	600	600	400	400
Each	**$12.50**	**18.00**	**18.00**	**10.50**	**9.75**

15-043. THERMOMETERS, Precision, same as No. 15-040, but **without certificate.** Made according to the specifications of the U. S. Bureau of Standards but not tested by the Bureau. The result of the Bureau's tests can not be anticipated.

Range, degrees C.	0 to 50	0 to 100	0 to 200	0 to 250	0 to 360
Subdivisions, degrees	⅒	⅒	⅕	½	1
Each	**$9.50**	**15.00**	**15.00**	**7.50**	**6.75**



15-055

15-045. THERMOMETER, Beckmann Differential, with auxiliary scale; scale reading **upward.** This is a differential type, indicating only the differences in temperature. The range covers 5 or 6° C., graduated in 1/100 degree subdivisions. The auxiliary scale at the top, reads from −10 to 140° C. in 2° subdivisions, and is used for adjusting the mercury column so that the 5-degree readings of the differential scale will occur at the desired temperature.

The scale is milk-white glass, sealed in the thermometer; a nickel-plated cap at the top has provision for suspending. The thermometer is about 21 inches long over all.

Thermometer Magnifier No. 15-170, greatly facilitates the reading of Beckmann thermometers. **Each, $18.00**

15-050. THERMOMETER, Beckmann Differential U. S. Bureau of Standards Certified, with auxiliary scale. This thermometer is similar to No. 15-045, but it has been tested by the United States Bureau of Standards and their certificate of accuracy is supplied with the thermometer. **Each, $30.00**

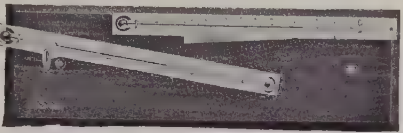
15-055. THERMOMETER, Beckmann Differential with auxiliary scale; scale reading downward. This thermometer is similar to No. 15-045 excepting that the scale is numbered to read downward, as used in freezing point determinations. **Each, $18.00**

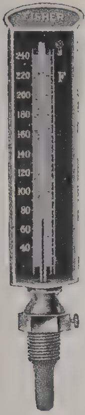
15-060. THERMOMETER, Beckmann Differential, with dropping chamber and auxiliary scale. This thermometer is similar to No. 15-045, but has a dropping chamber located below the auxiliary scale, which facilitates setting of the thermometer. This is a trap with a very fine capillary inlet tube. If the setting of the thermometer is found to be slightly higher than desired, it can be lowered by heating the bulb until the mercury of the main column is expelled in small drops into the trap. The temperature equivalent for each drop is small, and is noted on the thermometer. **Each, $21.00**

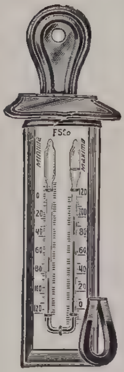
15-065. THERMOMETER, Beckmann Differential, U. S. Bureau of Standards Certified, with dropping chamber and auxiliary scale. This thermometer is similar to No. 15-060, but it has been tested by the United States Bureau of Standards and their certificate of accuracy is supplied with the thermometer. **Each, $33.00**

15-070. THERMOMETER, Large, 20 mm. diameter. Supplied with enclosed paper scale and **very large figures** which can be read at a distance; with glass ring at the top for suspending the thermometer.

Range, degrees	0 to 100 C.	0 to 200 C.	0 to 220 F.	0 to 400 F.
Subdivisions, degrees	1	1	2	2
Length, inches	12	14	12	14
Each	**$2.00**	**2.50**	**2.00**	**2.50**


15-095

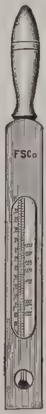

15-080
See also No. 15-085

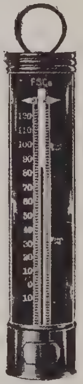

15-090

15-100

15-105

15-110


15-115


15-120

15-075. THERMOMETER, Angle, Large diameter. Supplied with enclosed paper scale with large figures; range, 0 to 240° F. The body is 12 inches long by ¾ inch diameter; the stem is 6 inches long by ⅜ inch diameter. Sometimes called "acid chamber" thermometer (*not illustrated*). **Each, $3.50**

15-080. THERMOMETER. Metal case, Straight, with ½-inch iron pipe thread connection; length, 10½ inches. Sometimes called "hot well" thermometers.

Range, degrees F. approx.	40 to 240	40 to 400
Each	**$4.00**	**5.50**

15-085. THERMOMETERS, Metal Case, Angle, with ½-inch iron pipe thread connection. Length of body, 7 inches; length of stem, 3½ inches.

Range, degrees F. approx.	40 to 240	40 to 400
Each	**$4.50**	**6.00**

15-090. THERMOMETER, Maximum and Minimum Registering, Sixe's Type. The thermometer is "U" shaped with the high temperature at the top on one side and the low temperature at the top on the other side. Metal-floats rise with the mercury column; one remains at the lowest temperature reached, the other at the highest temperature. These floats are reset by means of the magnet supplied. The scales are on a milk-white glass plate, mounted in an enameled sheet metal case, with provision for hanging. Range, −10 to +120° F.; length over all, about 11 inches. **Each, $6.00**

15-095. THERMOMETER, Maximum and Minimum, Registering, Weather Bureau Type. The maximum registering thermometer has a constriction and the mercury column remains at the maximum height until shaken down. The minimum thermometer has an "index" in the bore of the glass tube which is set in contact with the spirit column. The fall of the spirit column carries the "index" with it and leaves it at the lowest point reached, until it is reset.

Both thermometers are mounted in aluminum holders with the graduations legibly engraved on the metal. Range, 20° below zero to 120° F. above zero. Provided with a finished hardwood board 17 inches long by 5 inches wide, which has insulating supports and binding screws. **Each, $18.00**

15-100. THERMOMETER, "Cold Test." Supplied with enclosed paper scale having large figures; range, −20° to 110° F. Body is about 6 inches long by ¾ inch diameter; stem is about 4 inches long by ⅜ inch diameter. **Each, $3.25**

15-105. THERMOMETER, Floating Dairy, all glass. Range, 20° to 170° F.; with enclosed paper scale having churning, cheese, and scalding temperatures indicated thereon. Length, about 8 inches. **Each, $ .75**

15-110. THERMOMETER, Incubator. With enclosed milk glass scale; range, 0 to 50° C. graduated in single degrees with red line at 37½°. Length over all, 10 inches. **Each, $3.50**

15-115. THERMOMETERS, Wooden Case with handle. They can be immersed while holding the handle, or will float horizontally. Thermometers have enclosed paper scales with large figures.

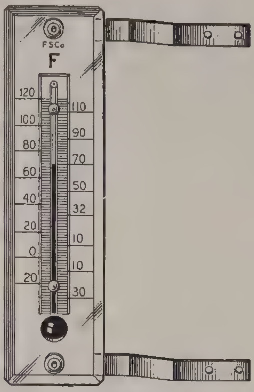
Range, degrees F.	20 to 220	0 to 220
Length, over all, inches	10	17
Each	**$1.00**	**1.60**

15-120. THERMOMETERS, Japanned sheet metal case. Supplied with metal scale engraved with large figures; with ring at top for carrying or hanging. Length of case, without ring, 12 inches.

Range, degrees F.	−10 to 120	−10 to 220
Subdivisions, degrees	1	2
Each	**$2.00**	**2.00**

Thermometers

15-125



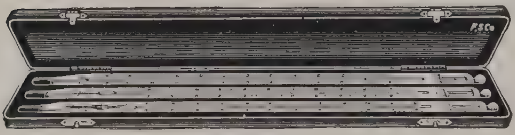
15-130

15-135

15-125. THERMOMETERS, Household. Range, −10° to 120° F.; for indoor or outdoor temperatures. Black oxidized scale with white graduations and figures. Mounted on hardwood back, with ring at top for hanging. **Each, $1.00**

15-130. THERMOMETER, Window. The thermometer is mounted on a heavy glass plate, 9¾ inches long, with beveled edges; the scale is milk white with black graduations and very large figures also in black. Range, about −30° to 120° F. Two detachable, metal brackets are provided for attaching to the window frame. **Each, $2.50**

15-135. THERMOMETER, Clinical, One Minute. Supplied with magnifying scale and factory certificate. In hard rubber case. **Each, $1.50**



15-140
See also No. 15-145

15-155
See also No. 15-160

15-140. THERMOMETER SET, Allihn, Precision. A set of three (3) thermometers about 300 mm. long over all and 8 mm. diameter, with enclosed white glass scales. Made according to the specifications as set forth in the *U. S. Bureau of Standards Circular No. 8, Third Edition, 1921.* Each thermometer is subdivided in ½° divisions. Ranges as follows: −15° to 100° C.; 100° to 200° C.; 200° to 300° C.

The set is supplied in a leatherette covered, velvet-lined case........................**Per set, $27.00**

15-145. THERMOMETER SET, Allihn, Certified by the U. S. Bureau of Standards. This set is similar to No. 15–140, but each thermometer has been tested by the United States Bureau of Standards, and their certificate is supplied with each of the three thermometers in the set. **Per set, $40.00**

15-150. THERMOMETERS, Allihn. Separate thermometers similar to those in No. 15-140 set; for replacement. Supplied without certificates.

Range, degrees C	−15 to 100	100 to 200	200 to 300
Each	**$8.00**	**9.00**	**10.00**

15-155. THERMOMETER SET, Anschütz, Precision. A set of seven (7) thermometers, about 155 mm. long over all and 6 mm. diameter, with enclosed white glass scales. Made according to the specifications as set forth in the *U. S. Bureau of Standards Circular No. 8, Third Edition, 1921.* Each thermometer is subdivided in ⅕° divisions. The higher range thermometers are gas filled. The ranges are as follows: −10° to 60° C.; 40° to 100° C.; 90° to 160° C.; 150° to 210° C.; 200° to 260° C.; 250° to 310° C.; 300° to 360° C.

The set is supplied in a leatherette covered, velvet-lined case.......................**Per set, $36.00**

15-160. THERMOMETER SET, Anschütz, Certified by U. S. Bureau of Standards. This set is similar to No. 15-155, but each thermometer has been tested by the United States Bureau of Standards, and their certificate is supplied with each of the seven thermometers. **Per set, $50.00**

15-165. THERMOMETER, Anschütz. Separate thermometers similar to those in No. 15-155 set; for replacement. Supplied without certificate.

Range, degrees C	−10 to 60	40 to 100	90 to 160	150 to 210
Each	**$4.50**	**4.50**	**4.50**	**4.50**
Range, degrees C		200 to 260	250 to 310	300 to 360
Each		**$6.00**	**6.00**	**6.00**

6-975

THERMOMETERS FOR CALORIMETERS

4-355. THERMOMETER, Calorimeter, Parr, with certificate. Range, 65 to 90° F. in 0.05° subdivisions. Length, 22 inches; with U. S. Bureau of Standards Certificate; for use with Nos. 4-350, 4-415, and 4-430 Parr Calorimeters. **Each, $12.00**

4-360. THERMOMETER, Calorimeter, Parr, without certificate. This thermometer is the same as No. 4-355, but is supplied without the certificate. **Each, $8.00**

4-515. THERMOMETER, Calorimeter, Emerson, with certificate. Range, 18 to 30° C. in. 0.02° subdivisions. Length, 24 inches; for use with Nos. 4-505 and 4-523 Emerson Calorimeters, with U. S. Bureau of Standards Certificate. **Each, $30.00**

4-520. THERMOMETER, Calorimeter, Emerson, without certificate. This thermometer is the same as No. 4-515 Thermometer, but is supplied without U. S. Bureau of Standards Certificate. **Each, $20.00**

4-600. THERMOMETER, Calorimeter, A. G. I., with certificate. This thermometer is recommended by the American Gas Institute for use in the No. 4-585 Gas Calorimeter. Range, 30 to 110° F. in 0.1° subdivisions; supplied with U. S. Bureau of Standards Certificate. **Each, $20.00**

4-595. THERMOMETER, Calorimeter, A. G. I., without certificate. This thermometer is the same as the No. 4-600 Thermometer, but is supplied without the certificate. **Each, $9.50**

4-610. THERMOMETER, Gas Meter, with case. Range, 40 to 110° F. in 1° subdivisions; for use in the No. 4-605 Gas Meter, and No. 4-585 Gas Calorimeter. Supplied in armored case. **Each, $6.00**

4-615. THERMOMETER, Gas Meter, without case. This thermometer is the same as No. 4-610, but is supplied without the armored case. **Each, $2.50**

(See also Beckmann Thermometers, page 538.)

THERMOMETERS FOR COAL BY-PRODUCT TESTS

6-875. THERMOMETER, F. S. Co. Standard, for the Distillation of Refined Products. Range, 60 to 140° F. in 0.2° subdivisions, for use with No. 6-865 Benzol Distillation Apparatus. **Each, $9.75**

6-975. THERMOMETER SET, F. S. Co. Calibration, Certified; for the standardization of other thermometers used in the routine testing of coal by-products. These thermometers are supplied only in sets of four (4) thermometers with ranges of 79 to 82°, 99 to 101°, 109 to 112°, and 136 to 142° C. in 0.1° subdivisions. Length, 150 mm. Each thermometer has been certified by the U. S. Bureau of Standards. **Per set, $85.00**

6-980. THERMOMETER, Koppers; for the Distillation of Pure By-Products, as benzol, napthas, etc. Range, 70 to 120° C. in 0.1° subdivisions. Length, 450 mm. **Each, $10.00**

6-985. THERMOMETER, F. S. Co. Standard, for the Distillation of Crude By-Products. Range, 0 to 250° C. in 1° subdivisions. Length, 400 mm. All markings are filled with black coloring matter, insoluble in benzol and similar vapors. **Each, $5.00**

6-990. THERMOMETER, F. S. Co. Freezing Point of Benzol. Range, 0° to 65° in 0.1° subdivisions. This thermometer is also used in the determination of the cloud, pour, freezing, and melting points of by-products **Each, $8.00**

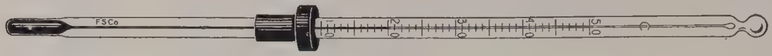
A. S. T. M. DISTILLATION THERMOMETERS

6-955. THERMOMETER, A. S. T. M., High Distillation, Centigrade. Range, 0° to 400° C. in 1° subdivisions. This thermometer is used in No. 6-910 Coal Tar Distillation, and No. 6-940 Wash Oil Distillation Apparatus. **Each, $6.00**

13-485. THERMOMETER, A. S. T. M., High Distillation, Fahrenheit. Range, 30° to 760° F. in 2° subdivisions. This thermometer is similar to the No. 6-955 Thermometer, but is graduated in the Fahrenheit scale. **Each, $6.00**

1-590. THERMOMETER, A. S. T. M., Low Distillation, Centigrade Range, 0° to 300° C. in 1° subdivisions. This thermometer is used in No. 1-585 Tar Dehydrating, No. 13-455 Gasoline Distillation, and No. 13-320 and No. 13-325 Turpentine Distillation Apparatus. **Each, $5.00**

13-480. THERMOMETER, A. S. T. M., Low Distillation, Fahrenheit. Range, 30° to 580° F. in 2° subdivisions. This thermometer is similar to No. 1-590 Thermometer, but is graduated in the Fahrenheit scale. **Each, $5.00**



13-605

M. C. A. STANDARD THERMOMETERS

15-166. THERMOMETERS, G Series, Partial Immersion. Adopted by A. S. T. M. for general use, also by **M. C. A.** (*Manufacturing Chemists' Association*), for general use and distillations. These thermometers are intended for general use in tests where no special thermometer is specified. *See A. S. T. M. Standard Methods for 1924, Serial Designations; D-182, 183, 184—23T*, also **M. C. A.** *Standard Specifications, Part 1.*

Thermometers are calibrated for 76 mm. (3 inch) immersion and have a line etched around the stem to indicate the depth of immersion. The accuracy is within ½ of one (1) degree; all thermometers are etched on the stem, are nitrogen filled, and comply with the specifications referred to.

No	G1	G3	G2
Range, Centigrade	—20 to 150	—5 to 300	—5 to 400
Subdivisions, degrees	1	1	1
Length, mm	305	380	405
Each	**$2.50**	**3.50**	**4.50**

15-168. THERMOMETERS, R Series, Partial Immersion. Adopted by **M. C. A.** (*Manufacturing Chemists' Association*), for accurate distillation, melting and freezing tests. All thermometers are calibrated for 76 mm. (3 inch) immersion and have a line etched around the stem to indicate the depth of immersion. The accuracy is within ⅕ of one (1) degree; all thermometers are etched on the stem, are nitrogen filled and comply with the standard specifications of the M. C. A. as set forth in Part 1, 1922.

No	R1	R2	R3	R4
Range, Centigrade	—36 to +54	—10 to +80	70 to 160	140 to 230
Subdivisions, degrees	⅕	⅕	⅕	⅕
Length, mm	405	405	405	405
Each	**$5.00**	**4.50**	**5.00**	**5.50**

THERMOMETERS FOR FLASH POINT TESTS

13-500. THERMOMETER, A. S. T. M., Low Range, P. M., Fahrenheit. Range, 20° to 230° F. in 1° subdivisions; length, 275 mm.; calibrated for a 2¼ inch immersion; for use with No. 13-495 and No. 13-510 Flash Point Testers. **Each, $4.25**

13-505. THERMOMETER, A. S. T. M., High Range, P. M., Fahrenheit. Range, 200° to 700° F. in 5° subdivisions; length, 275 mm.; calibrated for a 2¼ inch immersion; for use with No. 13-495 and No. 13-510 Flash Point Testers. **Each, $5.50**

13-520. THERMOMETER, Elliott, Range, -10° to 360° C. in 1° subdivisions; length, 14 inches; for use in No. 13-515 Elliott Flash Point Tester. **Each, $2.75**

13-535. THERMOMETER, A. S. T. M., Cleveland, Fahrenheit. Range, 20° to 760° F. in 5° subdivisions; length, 12 inches; calibrated for a one (1) inch immersion; used in No. 13-530 Cleveland Flash Point Tester. **Each, $5.50**

THERMOMETERS FOR SOFTENING POINT TESTS

1-555. THERMOMETER, A. S. T. M., Ring and Ball, Low Range. Range, 0° to 80° C. in 0.2° subdivisions; length, 400 mm.; calibrated for total immersion; for use in A. S. T. M. Test, Serial Designation D 36-21, for the determination of the softening point of bituminous substances. **Each, $7.00**

1-560. THERMOMETER, A. S. T. M., Ring and Ball, High Range. This thermometer is similar to No. 1-555 Thermometer, but has a range from 30° to 160° C. in ½° subdivisions. **Each, $7.50**

1-670. THERMOMETER, Softening Point, Barrett Type. Range, 30° to 160° C. in ½° divisions; length, 325 mm.; for use in No. 1-665 Softening Point Apparatus. **Each, $7.50**

THERMOMETERS FOR VISCOSIMETERS

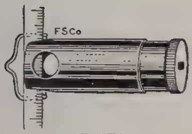
13-575. THERMOMETERS, A. S. T. M., Saybolt Viscosimeter. These thermometers are all 10 inches long and are used in No. 13-565 and No. 13-570 Saybolt Viscosimeters. Two (2) thermometers are necessary for the test; one for the bath, the other for the oil.

	FAHRENHEIT			
Thermometer	A	B	C	D
Range, degrees F	66-80	94-108	120-134	205-218
Subdivisions, degrees	⅕	⅕	⅕	⅕
For tests at, degrees F	77	100	122, 130	210
Each	**$5.00**	**5.00**	**5.00**	**5.00**

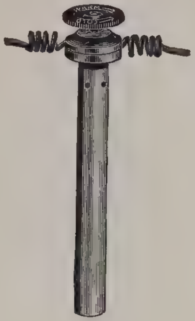
	CENTIGRADE			
Thermometer	E	F	G	H
Range, degrees C	19-27	34-42	49-57	95-103
Subdivisions, degrees	⅒	⅒	⅒	⅒
For tests at, degrees F	25	40	50	100
Each	**$5.00**	**5.00**	**5.00**	**5.00**

13-605. THERMOMETER, Engler Viscosimeter, Low Temperature. Range, 10° to 50° C. in 1° subdivisions; with brass collar to fit the opening in the top of No. 13-595 Viscosimeter. **Each, $4.50**

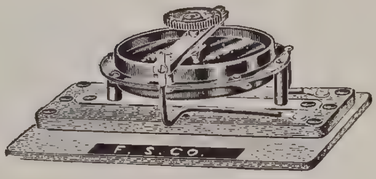
13-610. THERMOMETER, Engler Viscosimeter, High Temperature. This thermometer is similar to No. 13-605 Thermometer, but has a range of 10° to 150° C. in 1° subdivisions. **Each, $5.50**



15-170



15-180



15-175

THERMOMETERS FOR OVENS

1-535. THERMOMETER, Asphalt Drying Oven, Low Temperature. Range, 0° to 200° C. in 1° subdivisions; length, 24 inches with lower 12 inches ungraduated for insertion into the oven, so that the entire range is outside the oven. This thermometer is used in the No. 1-530, No. 13-295, and No. 13-305 Ovens.
See No. 1-532, page 23.

13-300. THERMOMETER, Asphalt Drying Oven, High Temperature. This thermometer is similar to the No. 1-555 Thermometer, but has a range of 0° to 300° C. in 1° subdivisions. **Each, $6.00**

1-545. THERMOMETER, Asphalt Drying Oven, A. S. T. M. Range, 150° to 175° C. in 1° divisions; length, 6 inches, standardized for total immersion; for use with No. 1-540 Asphalt Oven. **Each, $4.00**

THERMOMETERS FOR MISCELLANEOUS PURPOSES

13-410. THERMOMETER, Cloud and Pour Test. Range, −36° to +120° F. in 2° subdivisions; calibrated for total immersion; for use in No. 13-405 Cloud and Pour Test Apparatus. **Each, $3.00**

12-895. THERMOMETER, Molecular Weight, Auxiliary. Range, −20° to +40° C. in 2° subdivisions; for use in the cooling solution in the Beckmann Freezing-Point, Molecular Weight Apparatus. **Each, $2.00**

13-550. THERMOMETER, Paraffin, Melting Point, A. S. T. M., Wax. Range, 80° to 160° F. in 0.1° divisions, calibrated for 79 mm. immersion; for determining the temperature of the wax in the No. 13-540 Paraffin Melting Point Apparatus. **Each, $6.00**

13-555. THERMOMETER, Paraffin, Melting Point, A. S. T. M., Bath. Range up to 212° F. in 2° subdivisions; for determining the bath temperature in the No. 13-540 Paraffin Melting Point Apparatus. **Each, $1.75**

6-550. THERMOMETER, Urine—Specific Gravity. This thermometer is used for correcting the Specific Gravity of urine. It is calibrated directly in terms of Specific Gravity units to be added to or subtracted from the readings obtained with urinometers, so as to reduce all readings to the standard temperature of 77° F. Total length, 100 mm.; supplied in hard rubber case. **Each, $1.50**

6-555. THERMOMETER, Urine, Double Scale. This thermometer is about 300 mm. long; graduated to 100° C. and 212° F.; used for correcting the Specific Gravity of urine for temperature. **Each, $1.50**

13-330. THERMOMETER, Turpentine, A. S. T. M. Range, 145° to 200° C. in 0.2° subdivisions; length about 80 mm.; for use in No. 13-320 and No. 13-325 Turpentine Distillation Apparatus. **Each, $8.00**

15-170. THERMOMETER MAGNIFIER, for accurately reading finely graduated thermometers. The spring clamp will fit tubes from 6 to 16 mm. diameter, so that it can be attached to engraved-stem or Beckmann thermometers. It can also be used for reading burettes. The metal parts are nickel-plated, and the lens is focused by drawing the tube in or out. **Each, $3.00**

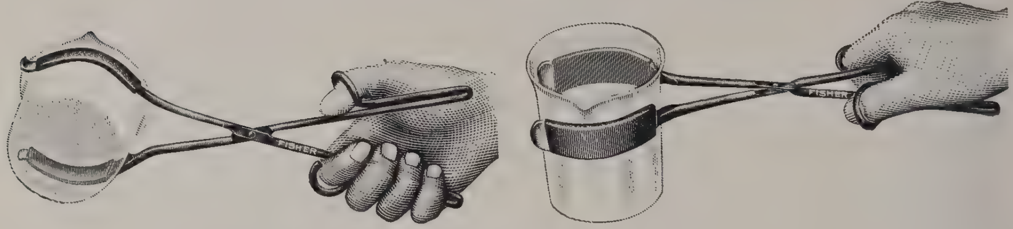
15-175. THERMOSTAT, Electric, C. S. & E., with condenser. This is the standard thermostat used with C. S. & E. incubators and paraffin ovens. Made of discs of hard rubber and copper, riveted together and held in a steel ring. A very small fraction of a degree will, owing to the difference in the expansion of rubber and copper, cause a cupping of the discs, and thus a break in the electric circuit. A condenser definitely stops the flowing arc and kills the spark when the platinum parts are separated, provided the current passing through **does not exceed three (3) amperes.** Can be used for delicately regulating the heat in any air-heated apparatus when the required temperature is between 30° and 60° C. Mounted on transite board. **Each, $13.00**

15-180. THERMOSTAT, Electric, C. S. & E., Pencil Type; for controlling the temperature of liquids in water baths, liquid jacketed apparatus, etc. It consists of a thin metal tube, 6 inches in length by ¾ inch diameter, hermetically closed at the bottom, containing a sensitive bimetallic bar which extends from the bottom halfway up the tube. The contact points are protected by a condenser which kills the electric spark, provided the electric current passing through it **does not exceed one (1) ampere.** Range of temperature from 30° to 70° C. **Each, $13.00**

TINTOMETERS, see Colorimeters, pages 231 to 243.

TONGS

FISHER SAFETY BEAKER TONG



FIRMLY GRIPPED - SAFELY TIPPED

2-620

2-620. TONGS, Fisher Safety, for Beakers (*Patent applied for*). **Made of Ascoloy.** Designed to fulfill the requirements of a device for the convenient and safe handling of beakers containing hot solutions, and for pouring their contents.

The handles extend beyond the finger-holds so that the weight of the beaker is supported by the palm of the hand and not merely by the fingers. The finger-hold and thumb-hold are designed so that the hand is held in a natural position with the end of the thumb against the outside of the handle. (*See illustration showing the gripping.*)

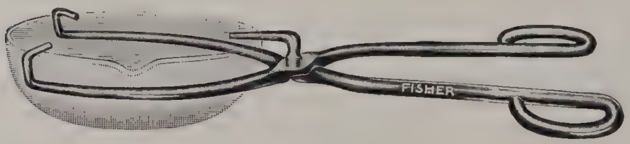
The jaws of the tong are one (1) inch wide, and are rubber covered. These grip the beaker firmly and permit it to be tipped without changing its position in the tong. The rubber covers on the jaws are replaceable.

Ascoloy. The entire tong is made of Ascoloy, a new stainless iron, which is tough and resists bending; will not rust, and is highly resistant to acids, especially nitric acid.

The Fisher Safety Beaker Tong will firmly grip Griffin Form Beakers from 100 ml. to 1500 ml. capacity. The tong is 13 inches long over all.

We recommend this tong as the most convenient for handling beakers, also as a good and inexpensive form of accident prevention. **Each, $1.25**

FISHER SAFETY DISH TONG



5-815

5-815. TONG, Fisher Safety, for Dishes (*Patented December, 1924.*). **Made of Ascoloy.** This is a new tong designed especially to fill the need for a device for the convenient and safe handling of hot evaporating dishes and their contents.

Design. With this tong, dishes are firmly gripped by the tong and held in this grip by the hand, and not merely supported by a piece of spring wire.

The tips of the jaws project up and over the top of the dish, and a center prong from the joint projects out over the top of the dish. The dish is held below the rim on the sides by the jaws and at three points on the top by the prongs so that it cannot possibly get out of tong until the handles are released.

Features. The grip permits hot dishes to be handled without liability of spilling the contents, or dropping the dish.

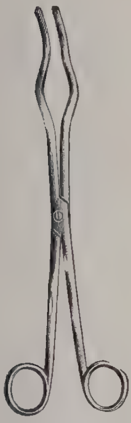
Contents of dishes can be poured without liability of spilling.

Dishes can be held firmly in an inverted position, and precipitates brushed out.

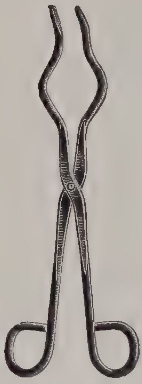
Ascoloy. The tong is made of Ascoloy, a new stainless iron, which is tough and resists bending; will not rust, and is highly resistant to acids, especially nitric acid.

The Tong is 9½ inches over all. This one size tong adjusts itself to different size dishes, and will firmly grip evaporating dishes, sizes B to E inclusive, or similar vessels with diameters from 75 mm. to 120 mm. inclusive.

The Fisher Safety Dish Tong is the only device that we know of with which hot dishes and their contents can be handled conveniently and without liability of accidents. **Each, $1.25**



15-185



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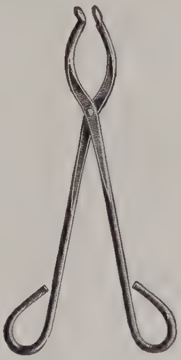

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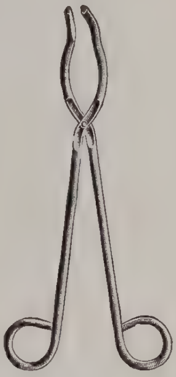
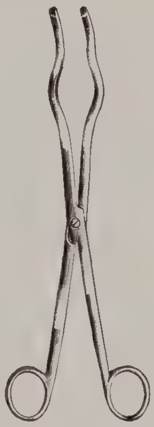


15-200



15-205

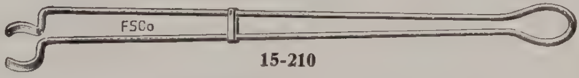
15-185. TONGS, Crucible, Nickel-Plated Steel, with corrugated tips. These tongs are drop-forged and have an instrument finish; they are strong, are nickel-plated and polished, and are the most popular style of crucible tongs. Length over all, 10 inches. **Each, $1.50**

15-190. TONGS, Crucible, Chromel. The entire tong is made of an alloy of nickel and chromium. When the tips of the tongs are subjected to the flame, a very thin film of oxide encases the tips and prevents further oxidation. After this film is formed, the tongs can be used to handle platinum crucibles without contamination of the platinum. They are rust proof and much less expensive than platinum-tipped tongs. Length over all, 9 inches. **Each, $3.25**

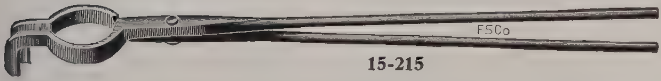
15-195. TONGS, Crucible, Polished Brass. An inexpensive tong which will not rust. Length over all, 8¾ inches. **Each, $ .65**

15-200. TONGS, Crucible, Oxidized Steel, with corrugated tips. The least expensive style. Length over all, 9 inches. **Each, $ .35**

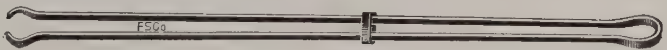
15-205. TONGS, Crucible, Monel Metal, with platinum shoes. The entire tong is Monel metal, fitted with hollow platinum shoes weighing about 2 grams. Length over all, 10 inches. **Price varies with the market price of platinum.**



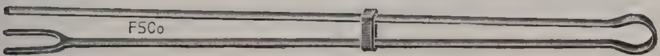
15-210



15-215



15-220



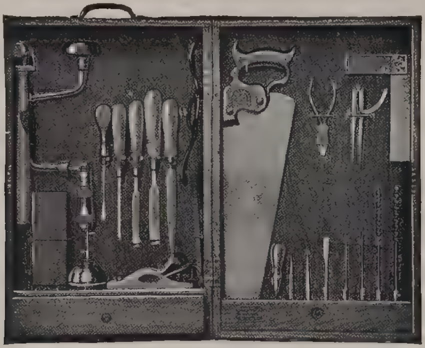
15-225

15-210. TONGS, Crucible, Julian. Made of steel, nickel-plated; for handling crucibles in a muffle furnace; with curved ends and a guide. Length over all, 22 inches. **Each, $3.00**

15-215. TONGS, Crucible, Heavy Wrought Iron. Used for handling large size crucibles. Will grasp the sides of crucibles with diameters from 2¾ inches to 5½ inches. Length over all, 30 inches. **Each, $4.00**

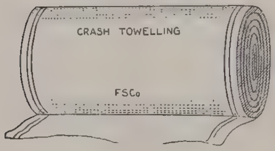
15-220. TONGS, Cupel; of spring steel with curved ends and guide. Length over all, 30 inches...... **Each, $2.25**

15-225. TONGS, Scorifier; of spring steel, with guide. One end of this tong is straight, while the other has two flat prongs. Length over all, 30 inches. **Each, $2.25**

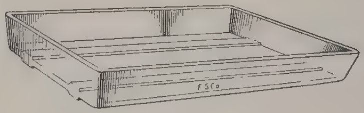


15-230

15-230. TOOL CABINET, Laboratory. The cabinet is made of polished quartered oak, substantially built, but light enough in construction to permit the outfit to be easily carried. Case is provided with lock and key, also with convenient handle for carrying. Outside dimensions are 22 inches in height, 14 inches in width, and 6 inches in depth. Each outfit contains **24 high grade tools** carefully selected to give as complete assortment as possible for most uses. Complete as illustrated. **Each, $36.75**



15-235



15-240

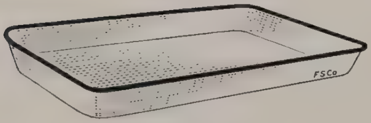
15-235. TOWELLING, Crash; 16¾ inches wide, in bolts of 50 yards.........................**Per yard, $ .30**
Per bolt, $12.50

15-240. TRAYS, Clear Glass, with slanting sides. Used as developing trays in photography, as instrument trays or as shallow receptacles.

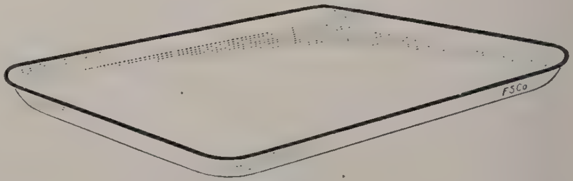
Length of bottom, inside, inches	5½	8½	9	10½
Width of bottom, inside, inches	4	5½	7	8½
Each	**$ .45**	**.60**	**.90**	**1.15**

Dozen lots of a size, 10% discount

TRAYS, Dissecting, see page 302.



15-245



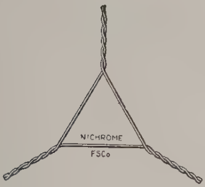
15-250

15-245. TRAYS, Aseptic, White Enameled. Made of seamless steel, white enameled with blue border. Used for dissecting instruments, syringes, pipettes, etc., or as shallow containers.

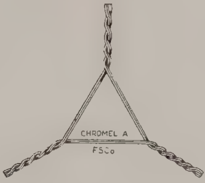
Length, inches	10	15
Width, inches	8	10
Depth, inches	1¾	2
Each	**$1.10**	**2.25**

15-250. TRAY, Aseptic, White Enameled, Large. Made of seamless steel, white enameled with blue border. Convenient for small dissections, handling of specimens, etc.; also convenient to protect table tops, or for carrying sterilized instruments, etc. Length, 20½ inches; width, 16½ inches; depth, 1 inch. **Each, $2.40**

TRIANGLES



15-255



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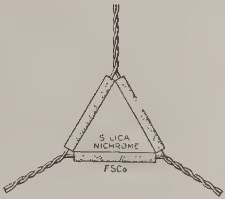
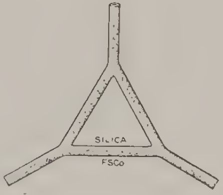


15-265



15-270

15-255. TRIANGLES, Nichrome, Round Wire. These triangles are made from a nickel-chromium-iron alloy. This metal will not rust or warp, and is but slightly affected by flames or ordinary acid fumes.

Length of side, inside, inches	1½	2	2½
Each	**$ .20**	**.20**	**.25**
Per package of 10	**$1.75**	**1.75**	**2.15**

15-260. TRIANGLES, Chromel A, Square Wire. These triangles are made from a nickel-chromium alloy **containing no iron.** They are stiffer and more resistant to oxidation than No. 15-255 Triangles, and are recommended for use with platinum crucibles. After a very thin film of oxide is formed, further oxidation is stopped and the triangles can be used for holding platinum crucibles without contaminating the platinum.

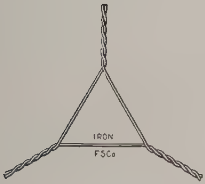
Length of side, inside, inches	1½	2	2½
Each	**$ .30**	**.30**	**.35**
Per package of 10	**$2.75**	**2.75**	**3.25**

15-265. TRIANGLES, Nichrome Wire, covered with glazed silica tubes.

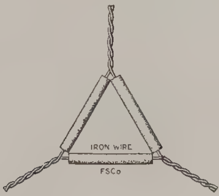
*Length of side, inside, inches	1½	2	2½	3
Each	**$ .50**	**.50**	**.65**	**.80**
Per dozen	**$4.80**	**4.80**	**6.60**	**7.80**

15-270. TRIANGLES, All Opaque Silica. These triangles are made entirely of opaque glazed silica.

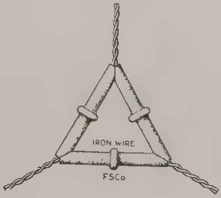
Length of side, inside, inches	1½	2
Each	**$1.50**	**1.50**



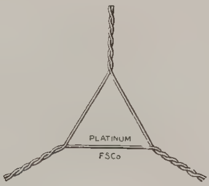
15-275



15-280



15-285



15-290

15-275. TRIANGLES, Iron Wire, twisted ends; the least expensive style.

Length of side, inside, inches	1½	2	2½
Per dozen	**$ .80**	**.80**	**.80**

Gross lots of a size, 15% discount

15-280. TRIANGLES, Iron Wire, covered with clay pipe stems.

Length of side, inside, inches	1½	2	2½
Each	**$ .15**	**.15**	**.15**
Per dozen	**$1.25**	**1.25**	**1.25**

Gross lots, 15% discount from dozen price

15-285. TRIANGLES, Iron Wire, covered with flanged clay pipe stems. The crucible rests on three points, and is completely exposed to the flame

Length of side, inside, inches	2	2½	3
Each	**$ .20**	**.20**	**.20**
Per dozen	**$1.60**	**1.60**	**1.60**

Gross lots, 15% discount from dozen price

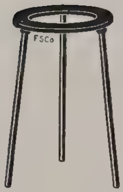
15-290. TRIANGLES, Platinum, with twisted ends

To hold platinum crucible, capacity, ml	10	15	20	25	30	40	50
Approximate weight, grams	5	7	10	12	12	14	16

Price according to the platinum market.

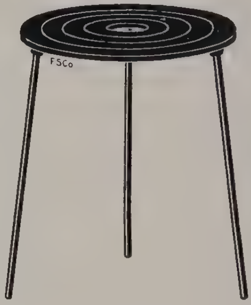
**Sizes recommended by the American Chemical Society, Standardization Committee.*

TRIPODS



15-295

15-300



15-305

15-295. TRIPOD, Iron, Small, japanned, light pattern; legs are threaded and screwed into the ring. Suitable for alcohol lamps, small burners, etc. Height, 6 inches, inside diameter of ring, 2½ inches, outside diameter of ring, 3⅝ inches.
Each, $ .40
Dozen lots, 10% discount

15-300. TRIPODS, Iron, japanned; single ring, flanged inside. The legs are threaded and screwed into the ring. All sizes are 9 inches high.

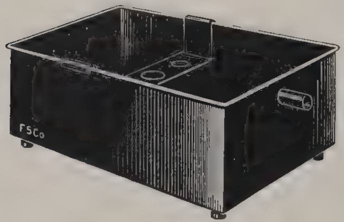
Outside diameter, inches	5	6	8
Each	**$ .45**	**.65**	**.90**

Dozen lots of a size, 10% discount
Gross lots of a size, 20% discount

15-305. TRIPODS, with concentric rings. Made of iron, japanned; each ring is recessed to take the next smaller ring. The legs are threaded, and screw into the ring of the tripod.

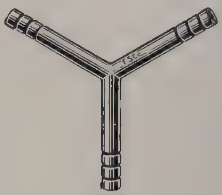
Outside diameter of largest ring, inches	5	6	8	10
Number of loose rings	1	2	3	4
Each	**$ .70**	**1.00**	**1.50**	**2.00**

Dozen lots of a size, 10% discount



15-310

15-315



15-320

15-310. TROUGHS, Pneumatic, mounted on four small feet. Made of japanned tin, with sliding shelf and overflow.

Length, inches	10	12	15
Width, inches	7	9	11
Depth, inches	4	5	6
Each	**$1.60**	**2.50**	**3.10**

Dozen lots of a size, 10% discount

TUBES, Distilling Columns, see pages 310 and 311

15-315. TUBES, Connecting, of brass; "T" shape, with corrugations on end of each arm for rubber tubing.

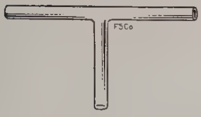
Inside diameter, inches	3/16	¼	⅜
Approximate length of each arm, inches	1⅞	1⅞	2
Each	**$ .40**	**.40**	**.45**

Dozen lots of a size, 10% discount

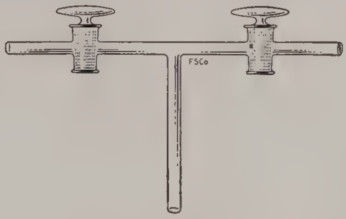
15-320. TUBES, Connecting, of brass; "Y" shape, with corrugations on end of each arm for rubber tubing.

Inside diameter, inches	3/16	¼	⅜
Approximate length of each arm, inches	2	2	2
Each	**$ .40**	**.40**	**.45**

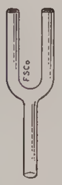
Dozen lots of a size, 10% discount



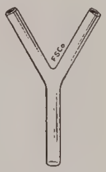
15-325



15-330



15-335



15-340

15-325. TUBES, Connecting, of glass, "T" shape; made of shell tubing.

Outside diameter, inches	¼	⁵⁄₁₆	⅜	½
Length of arms, inches	1½	1½	1¾	2
Each	$ .13	.13	.15	.18

Dozen lots of a size, 10% discount

15-330. TUBE, Connecting, of glass, "T" shape, with stopcocks. Made of shell tubing, 6 mm. outside diameter; bore of stopcock plugs, 2 mm; length of arms 75 mm. **Each, $2.50**

15-335. TUBES, Connecting, of glass, "U" shape; made of shell tubing.

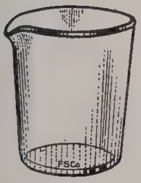
Outside diameter, inches	¼	⁵⁄₁₆	⅜	½
Length of arms, inches	1½	1½	1¾	2
Each	$ .15	.15	.18	.20

Dozen lots of a size, 10% discount

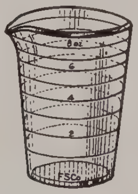
15-340. TUBES, Connecting, of glass, "Y" shape; made of shell tubing.

Outside diameter, inches	¼	⁵⁄₁₆	⅜	½
Length of arms, inches	1½	1½	1¾	2
Each	$ .15	.15	.18	.20

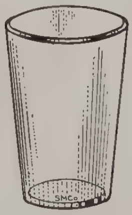
Dozen lots of a size, 10% discount



2-570

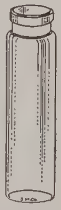


2-575



2-580

3-330



3-335

3-340

2-570. TUMBLER, of heavy molded glass, with pour-out, low wide shape. For general use with cold solutions not intended to be heated. Capacity to pour-out, 8 ounces. **Each, $ .20**
Per dozen, 10% discount

2-575. TUMBLER, Heavy Glass, with pressed graduations and pour-out, intended for approximate measuring of cold solutions, not to be heated. Capacity, 8 ounces; with one (1) ounce divisions. **Each, $ .25**
Per dozen, 10% discount

2-580. TUMBLERS, of heavy molded glass. Used as containers for cold solutions; not to be heated.

Capacity to brim, ounces	6	12
Each	$ .10	.15

Dozen lots of a size, 10% discount

URINE TESTING APPARATUS, see pages 195 to 215.

3-330. VIALS, Specimen. Made of clear glass, straight sides, flat bottom, without neck; sometimes called "shell vials." Furnished without corks.

Height, mm	40	50	60	70	80	80
Diameter, mm	15	20	25	25	20	25
For cork No.	4	7	11	11	7	11
Per dozen	$ .15	.30	.45	.50	.35	.55

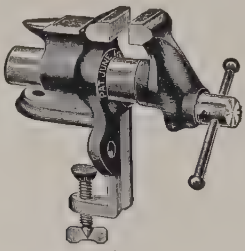
Gross lots of a size, 15% discount

3-335. VIALS, Specimen, "Homeopathic." Made of clear glass, with necks; furnished without corks.

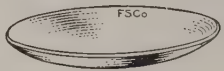
Capacity, drachms	1	2	4	6	8
Approximate capacity, ml	5	8	12	25	30
Height, over all, mm	45	60	70	80	90
Diameter, mm	14	16	20	22	24
Per dozen	$ .20	.25	.40	.55	.65
Per gross	$1.70	2.10	3.75	5.00	6.25

3-340. VIALS, Specimen, Screw Cap. Similar to No. 3-335 in size and shape, but with metal screw caps of aluminum.

Capacity, drachms	1	2	4	6	8
Per dozen	$ .35	.40	.50	.70	.80
Per gross	$3.00	3.60	5.00	7.00	8.00



15-345



2-610

15-345. VISE, with anvil; of japanned iron with jaws and anvil chilled hard. This vise can be fastened to table or bench by means of a clamp which is at the base of the vise. The body of the vise is also provided with two countersunk screw holes so that it can be secured to the bench if desired. Width of jaws, 2½ inches, opening of jaws, 2¾ inches, weight, 9½ pounds. **Each, $4.75**

VOLUMETER, Scott, see No. 13-355, page 484.

WATCH GLASSES

(Watch Glasses, Counterpoised, see Balance Pans, page 55)

2-610. WATCH GLASSES, of thin glass; well annealed, concave shape with finely ground edges. Used for covering beakers when boiling solutions. The glass is thin and well annealed to withstand heat changes. The concave shape prevents the cover from sliding off the beaker, and also returns the condensation to the beaker. These are also used to cover funnels, dishes, jars, etc.

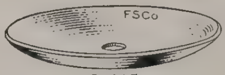
*Diameter, mm.	25	35	50	65	75	90
Per dozen	**$ .35**	**.40**	**.45**	**.55**	**.70**	**.85**

Gross lots of a size, 15% discount

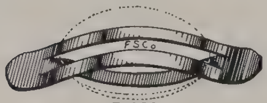
*Diameter, mm.	100	115	125	150	175	200
Per dozen	**$ .90**	**1.10**	**1.40**	**1.80**	**2.40**	**3.00**

Gross lots of a size, 15% discount

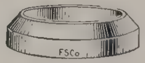
15-350



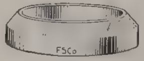
2-615



5-880



15-355



15-360

15-350. WATCH GLASSES, in pairs; with edges ground to fit accurately together. For use with Clamp No. 5-880.

Diameter, inches	2	2½
Per pair	**$ .25**	**.30**

5-880. WATCH GLASS CLAMP, for clamping together, paired watch glasses up to and including 2½ inches diameter. This clamp is nickel-plated, is 4¼ inches long over all, with a double slit 3½ inches long, and is ⅞ inch wide. **Each, $ .30**

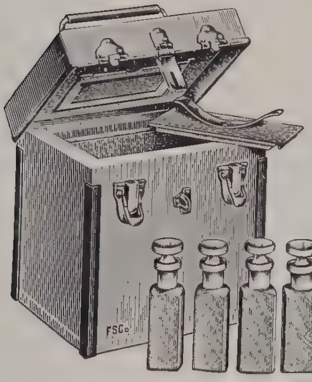
2-615. WATCH GLASS, with ⅜-inch hole in center, to permit stirring without removing watch glass from beaker, etc.; concave shape with edges finely ground. Diameter, 4 inches. **Each, $ .25**
Per dozen, 10% discount

15-355. WATCH GLASS, Syracuse, of clear glass, with beveled edge; outside diameter at bottom, 65 mm.; inside diameter, 50 mm.* These are grooved at the bottom to facilitate stacking. **Per dozen, $1.20**
Per gross, 10% discount

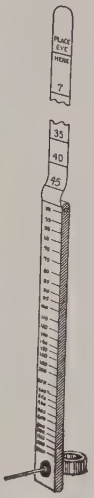
15-360. WATCH GLASS, Syracuse, Ground Edges. These are similar to No. 15-355, but the edges are ground so that they can be written upon.* **Per dozen, $1.50**
Per gross, 10% discount

**Sizes recommended by the American Chemical Society, Standardization Committee.*

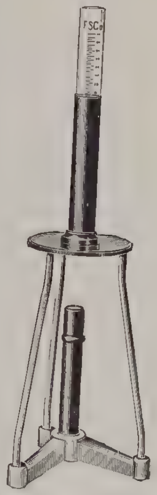
WATER ANALYSIS APPARATUS



15-365



15-375



15-380

15-365. WATER SAMPLE CASE, with Combined Bottle Holder and Ice Compartment. Designed and used to transport water samples, and to maintain a low temperature during transportation and thus prevent bacterial growth. The case is of the West Virginia Style and is made of heavy galvanized iron throughout, finished in aluminum, reinforced with brass edges, and equipped with brass trimmings. It is double walled; the space between the walls is packed with insulating material. The bottles are mounted in a rack and are held in place by springs pressed onto the stoppers when the cover is closed. The ice chest is about 3 x 6 x 6 inches, and is at the rear of the bottle rack. A cover on the ice chest is held in place by springs, which prevents the ice from breaking the bottles. The case is fitted with brass snaps and a hasp for a lock or wire seal. Below the handle is a heavy brass plate to be engraved with the name of the laboratory. On the inside of the cover is a pocket with a celluloid front for holding directions for taking samples, history of samples, or other records. Case as described, with four (4) 2-ounce Sample Bottles No. 15-370. **Each, $23.00**

Cases holding a larger number of bottles can be supplied to order.

15-370. WATER SAMPLE BOTTLE, for use in No. 15-365 Water Sample Case, square base; with mushroom stopper; capacity, 2 ounces. Made of clear glass with one side frosted so that history of sample can be written directly on the glass. **Each, $ .45**
Per dozen, $4.80

15-375. WATER TURBIDITY SCALE, U. S. Geological Survey Standard; for determining the turbidity of water. This turbidity scale is made of aluminum. It is 8 inches long and graduated in "parts per million." To one end is attached a 4-foot, non-stretchable tape, also graduated. Near the other end is a nickel-plated screw-eye carrying a platinum-plated wire. The scale is immersed into the water and the tape held taut by means of a stick inserted into the screw-eye, until the wire just disappears when sighted from a point marked near the upper end of the tape. The depth of the wire, as shown by the graduations, then indicates the degree of turbidity in terms of parts of silica per million parts of water.

Turbidity scale with platinum-plated wire, in hardwood carrying case. **Each, $11.00**

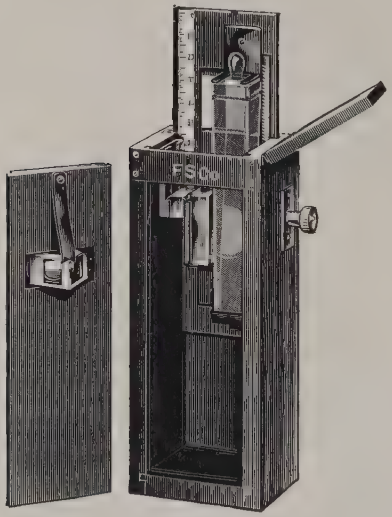
15-380. TURBIDIMETER, Jackson; for determining the turbidity of water. For method, see American Public Health Association "*Method of Analysis,*" *8, 1917*. This turbidimeter has a heavy metal base which carries the candle support and tube holder. The tube is of glass and is graduated for 25 cm. in mm. divisions, for indicating the depth of liquid under observation. To the left of the main scale is a mark indicating a volume of 100 ml.; to the right of the main scale is another scale graduated to read turbidity in terms of "parts of silica per million" and covers a range of from 100 to 5000 parts. Turbidimeter is supplied with one (1) 25 cm. tube, but without candle. **Each, $20.00**

4-665. STANDARD CANDLES, for use in No. 15-380 Jackson Turbidimeter. These candles are made from beeswax and spermaceti, according to specifications which prescribe their burning within the limits of 114 and 126 grains per hour. Supplied in one-pound cartons containing twelve candles. **Per carton of 12, $3.15**

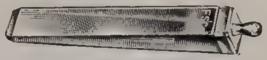
15-385. TURBIDIMETER TUBE, Glass, 25 cm.; for replacement of the tube supplied with No. 15-380 Jackson Turbidimeter. Range, 100 to 5000 parts per million. **Each, $3.75**

15-390. TURBIDIMETER TUBE, Glass, 75 cm.; for use in No. 15-380 Jackson Turbidimeter. This tube is similar to the No. 15-385 Tube, but is calibrated for a depth of liquid up to 75 cm. and a range of from 25 to 5000 parts per million. It also has a dilution scale graduated for 400 ml. in 100 ml. divisions. When this tube is used, Tube Guard No. 15-395 should also be used with it. **Each, $5.00**

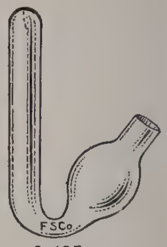
15-395. TURBIDIMETER TUBE GUARD, for use in No. 15-380 Jackson Turbidimeter when the No. 15-390 Tube, 75 cm. long, is used. **Each, $4.00**



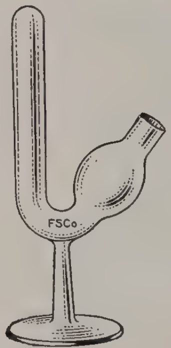
7-255



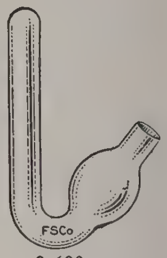
7-245
See also No. 7-260



9-695



9-685



9-690

7-255. WATER COLORIMETER, Hellige; for the colorimetric analysis of water. This colorimeter has mounted at the left side, a rectangular glass trough for holding a sample of the water to be tested. A glass wedge at the right contains the standard known liquid, and fits into a clamp on the rear of the case, which is raised or lowered by a screw on the side of the case. A scale at the rear, graduated in 100 divisions, moves with the wedge, and indicates the percentage of concentration of the unknown liquid in terms of the known standard. The colorimeter is illuminated through a white glass window in the rear. The light passes through both liquids and their images are brought side by side by two optical prisms and observed through the rectangular aperture in the front.

A choice of any of the wedges can be made from those listed under No. 7-260, or an Empty Wedge No. 7-245, can be filled by the operator with any known solution and used as a standard.

Water Colorimeter with trough, but without wedges. **Each, $40.00**

7-260. WEDGES, Standard, for Water Colorimeter No. 7-255. Each of these wedges is made of glass and is filled with a solution and is a color standard for a particular test. Each wedge is supplied with a ground glass stopper, and directions for use.

Wedge No.	Test	Wedge No.	Test
60	Ammonia	67	Hydrogen Sulphide
61	Nitrous Acid	68	Phenols
62	Nitric Acid	69	Mercury
63	Sulphurous Acid	70	Titanium
64	Iron	71	Chromates
65	Copper	72	Chloride
66	Lead	73	Vanadium

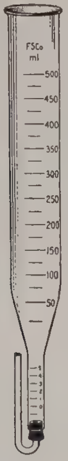
All wedges are the same price. **Each, $20.00**

7-245. WEDGE, Empty, for Water Colorimeter No. 7-255. This wedge is made of glass with optically plane surfaces, front and rear; the side surfaces are ground glass. The wedge is filled through an opening in the top and is provided with a ground glass stopper. **Each, $10.00**

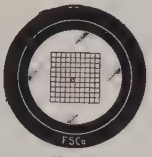
9-685 FERMENTATION TUBE, A.P.H.A. Standard; adopted by the American Public Health Association. This is also the larger size recommended by the American Bacteriological Society. The vertical tube is 140 mm. high by 15 mm. inside diameter; the bulb is 38 mm. diameter; the tubulature is long to accommodate cotton plugging. *Recommended for use in the Examination of Water and Sewage according to the A.P.H.A. Standard Methods, 1917.* **Each, $ .45**
Dozen lots, 10% discount

9-690. FERMENTATION TUBE, Without Base, A.P.H.A. Standard. The dimensions of this tube are the same as No. 9-685, but it is made without the base. **Each, $ .30**
Dozen lots, 10% discount

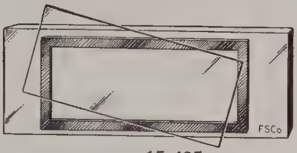
9-695 FERMENTATION TUBE, Constricted, without Base, Smith modification. The dimensions of this tube are the same as the A.P.H.A. Standard No. 9-685, but the connecting tube is constricted as modified by Dr. Theobald Smith. The outside diameter of the tube between the bulb and the evolution tube is 10 mm. This constricted design effects a better isolation of the two branches. This permits less interchange of fluid, which is desired, because the reactions or hydrogen ion concentrations are different in tube and bulb when bacteria ferment sugars very slowly. If desired, a small amount of mercury can be placed in the connecting tube to further constrict or seal the passage. **Each, $ .35**
Dozen lots, 10% discount



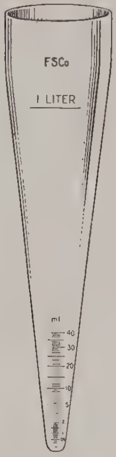
15-400
See also No. 15-405 and No. 15-410



15-435



15-425



15-440

15-400. SEDGWICK-RAFTER FUNNEL, Glass, Graduated; for the collecting of the non-bacterial organisms (plankton) in water by filtration through sand, preparatory to their being counted in the No. 15-425 Counting Cell. *For method, see Mason "Examination of Water," 162, 1917.*

The funnel is about 19 inches long and 2 inches in diameter, and is graduated to 500 ml. in 25 ml. divisions. The lower end is drawn down to a stem and is calibrated to 5 ml. in 1 ml. divisions. An additional 1 ml. graduation mark below the zero line, indicates the depth to which the filtering sand is charged and to which the rubber stopper which carries the delivery tube, is inserted. A small piece of bolting cloth, No. 15-415, should be placed over the rubber stopper to prevent the sand, No. 15-420, from entering the delivery tube. Supplied with stopper and delivery tube, but without bolting cloth or sand. **Each, $2.50**

15-405. SEDGWICK-RAFTER FUNNEL, Glass, Ungraduated. This funnel is similar to the No. 15-400 Funnel, but is not graduated. **Each, $1.50**

15-410. FUNNEL SUPPORT, for No. 15-400 and No. 15-405 Sedgwick-Rafter Funnels. This support has a cast-iron base, 6 x 9 inches, with a 24-inch supporting rod, and has two adjustable iron clamps. **Each, $2.55**

15-415. BOLTING CLOTH DISCS, for use with No. 15-400 and No. 15-405 Sedgwick-Rafter Funnels. These discs are made of specially woven silk bolting cloth of 200 mesh, and are cut so as to fit directly over the rubber stopper of the funnel. **Per dozen, $ .35**
Per gross, $3.00

15-420. BERKSHIRE SAND, for use in No. 15-400 Sedgwick-Rafter Funnel. This sand is specially washed and graded to retain the sediment. **Per pound, $ .25**

15-425. CELL, Plankton, Counting; for holding the plankton collected in the No. 15-400 Sedgwick-Rafter Funnel, while being counted under the microscope. This cell has a glass base-plate with non-corroding metal walls cemented to it. The base of the cell proper is 20 x 50 mm.; the capacity of the cell is 1 ml. Cell is supplied with three (3) very thin cover glasses, which permit of the use of high power, short focal length lenses. **Each, $6.75**

15-430. COVER GLASS, Extra; for use with No. 15-425 Plankton Counting Cell. Made of very thin, clear glass, 25 x 55 mm. **Each, $ .50**

PIPETTES, for filling Counting Cell; see No. 13-650 Pipettes, 1 and 5 ml. sizes.

FLASK, for diluting plankton concentrate collected on Sedgwick-Rafter Funnel; see No. 10-200 Flasks, size 25 ml.

15-435. EYEPIECE MICROMETER, Whipple; for use in counting plankton under the microscope. For method, *see G. C. Whipple, "The Microscopy of Drinking Water."* This micrometer fits the eyepiece of any standard microscope and is placed, scale downwards, on the eyepiece diaphragm. It is a glass disc mounted in a metal frame, and is ruled with a large square, divided into 100 smaller squares, while one of these is subdivided into 25 still smaller squares. **Each, $6.00**

15-440. CONE, Imhoff, Settling, Glass; for the determination of the amount of suspended matter in sewage by the Imhoff Sedimentation Method. This cone is 19 inches high, has a mark to indicate one (1) liter, and is graduated at its lower end to 40 ml. **Each, $4.25**

BERKFIELD FILTER, for the determination of suspended matter in water, see page 330.

COUNTING APPARATUS, for counting the colonies of bacteria in a culture, see No. 7-910, page 263.

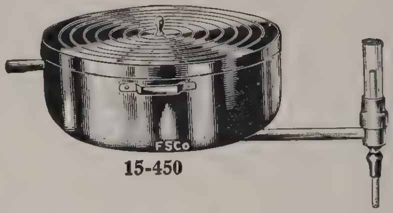
DISTILLING APPARATUS, Maharg; for the determination of ammonia in water, see No. 9-110, page 309

NESTLER TUBES, for the determination of Nitrites and Nitrates in water, see page 229.

PIPETTES, For Water Analysis, see No. 13-680, page 497.

WATER BATHS

15-445



15-450

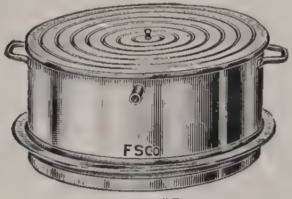
15-445. WATER BATHS, of polished, heavy copper, tin lined; with brass handles, steam escape and concentric copper rings with cover. These water baths have reinforced rims.

*Diameter, inches	4	5	6	8	10
Number of rings	3	4	5	7	8
Each	**$1.45**	**1.75**	**2.25**	**3.75**	**7.00**

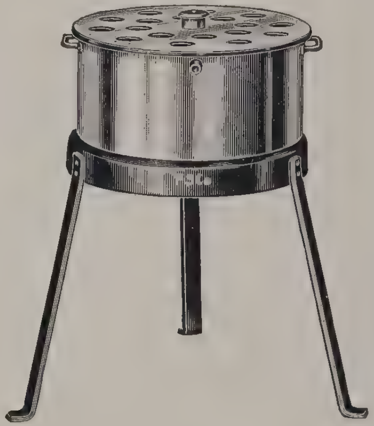
Dozen lots of a size, 10% discount

15-450. WATER BATHS, with constant water levels. These baths are similar to No. 15-445, but are equipped with constant water levels; they are fitted with a glass overflow tube held by a rubber connection. The water can be fed in the top beside the overflow tube, and the desired level constantly maintained.

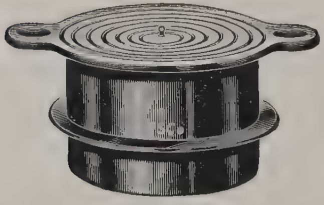
*Diameter, inches	6	8
Each	**$3.50**	**5.00**



15-455
See also No. 15-460



15-465



15-470
See also No. 15-475

15-455. WATER BATHS, of polished, heavy copper, tin lined; with brass handles, steam escape, concentric copper rings with cover and perforated plate for test tubes, seamless body. These water baths are flanged to fit Tripods No. 15-460.

*Diameter, inches	6	8
Number of rings	5	7
Number of perforations in plate	12	19
Diameter of perforations, inches	11/16	7/8
Each	**$5.25**	**7.50**

15-460. TRIPODS, of japanned iron, with top of legs threaded and screwed into the lugs of the ring. These tripods are without the inside flange so that they will take No. 15-455 Water Baths. Height, 9 inches.

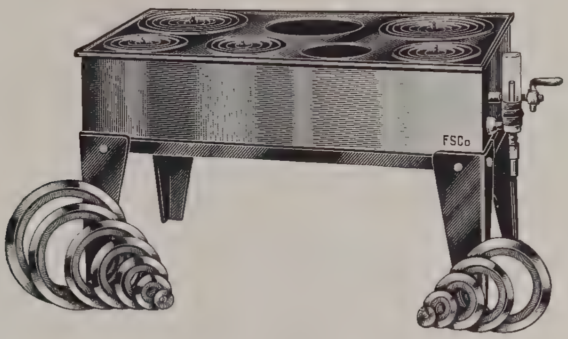
*Inside diameter, inches	6	8
Outside diameter, inches	7½	9½
Each	**$ .90**	**1.25**

15-465. WATER BATH, Army Medical School Model; to accommodate 18 test tubes. Made of polished copper, tin lined, with brass handles and side tube for refilling. Diameter of water bath is 8 inches; depth, 4 inches, with offset near the bottom on which is fitted a removable plate having 18 perforations, each ½ inch diameter. The top plate has 18 perforations each ⅞ inch diameter, and is provided with tubulation for a thermometer. Complete with tripod, 9 inches high. **Each, $5.75**

15-470. WATER BATH, Cast Iron, white enameled inside, with flange for resting on tripod, and with copper concentric rings. Outside diameter, 7¼ inches; depth, 4 inches. **Each, $6.00**

15-475. TRIPOD, for No. 15-470 Water Bath; japanned iron, 9 inches high........................ **Each, $1.25**

**Sizes recommended by the American Chemical Society, Standardization Committee.*



15-480
See also No. 15-485 and No. 15-490

15-480. WATER BATH, Rectangular, with seven openings; for evaporations. Made of heavy polished copper, tin lined, with stopcock and constant water level fitted with overflow tube and rubber connection.

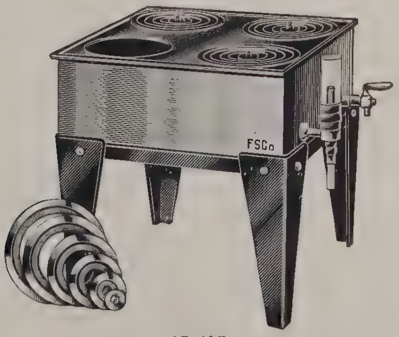
This water bath has seven openings, three of which are 6 inches in diameter with six copper concentric rings and cover, and four are 4 inches in diameter with four rings and cover.

Size, 23 x 13½ x 5 inches. A support beam placed underneath the top of the bath, prevents sagging. Complete on rigid rectangular support with detachable sheet iron plate which rests on top of support and protects the copper bottom from the flame. **Each, $30.00**

15-485. WATER BATH, Steam Heated. This is similar to No. 15-480, but is equipped with a steam coil for heating the water. **Each, $37.50**

15-490. WATER BATH, Electrically Heated. This is similar to No. 15-480, but is equipped with an electrically heated immersion coil, and is provided with a 3-heat switch. Maximum heat, 1650 watts. Coils must be covered with water at all times to prevent burning out. Supplied for use on **110 volts** unless otherwise ordered. **Each, $75.00**

Baths for use on 220-volt current can be supplied to order, at the same price.



15-495
See also No. 15-500 and No. 15-505

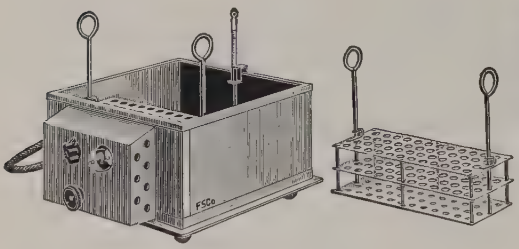
15-495. WATER BATH, Square, with four openings. This is similar in construction to No. 15-480, but has four openings, each 5 inches diameter with five concentric rings and cover. Size, 14 x 14 x 5 inches. A support beam placed underneath the top of the bath, prevents sagging. Complete on rigid support with detachable sheet iron plate which rests on top of support and protects the copper bottom from the flame. **Each, $21.00**

15-500. WATER BATH, Square, Steam Heated. This is similar to No. 15-495, but is equipped with a steam coil for heating the water. **Each, $28.00**

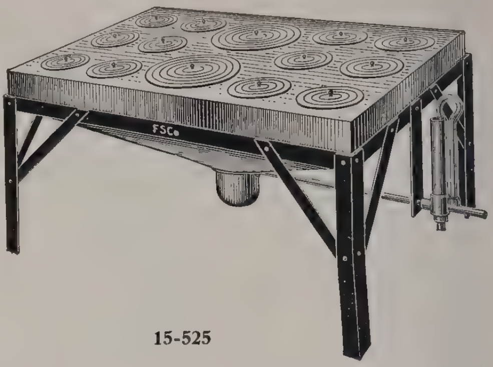
15-505. WATER BATH, Electrically Heated. This is similar to No. 15-495, but is equipped with an electrically heated immersion coil, and is provided with a 3-heat switch. Maximum heat, 110 watts. Coils must be covered with water at all times to prevent burning out. Supplied for use on **110 volts,** unless otherwise ordered. **Each, $55.00**

Baths for use on 220-volt current can be supplied to order, at the same price.

Water Baths



15-510
See also No. 15-515 and No. 15-520



15-525

15-510. WATER BATH, Wassermann, Electrically Heated, Automatically Controlled. Fulfills the demand for a small and conveniently arranged bath which will maintain a constant temperature. Used for serological work, for holding agar tubes above the solidifying temperature, for standardizing disinfectants, etc.

The bath is made of heavy copper, tinned on the inside and covered on the outside with a thick insulating material to prevent radiation. The special units which heat the bath are placed in metal tubes near the bottom of the bath, and can be easily replaced. The temperature is controlled by a very sensitive thermostat in metal tube, and is installed parallel with the heating units. A pilot lamp is provided for indicating when the current is on or off. A snap switch is also provided for controlling part of the heating units for the purpose of changing the temperature of the bath from 37½° C. to 56° C., if such change should be desired.

There are two metal racks made of brass, nickel-plated, with adjustable supports by means of which the racks can be immersed to any desired depth in the bath. Each rack holds 48 test tubes, 3 x ⅝ inch size. The racks have handles for conveniently lifting them out of the bath. Capacity of bath, 96 tubes; size, 9 x 9 x 5 inches. Supplied with cord and plug and a special thermometer, 0° to 80° C. For use on **110-volt current,** unless otherwise specified. **Each, $65.00**

Baths for use on 220-volt current can be supplied to order, at the same price.

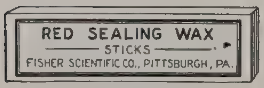
15-515. WATER BATH, Wassermann, Single, Electric. Similar to No. 15-510 with automatic temperature control, but provided with one (1) tray. Inside dimensions, 9 inches long by 4½ inches wide by 5 inches deep; capacity, 48 test tubes. Complete with one rack, cord and connecting plug, and one special thermometer, 0° to 80° C. For use on **110-volt current,** unless otherwise ordered. **Each, $50.00**

Baths for use on 220-volt current can be supplied to order, at the same price.

15-520. RACKS, Extra; for use with Wassermann Baths No. 15-510 and No. 15-515. Capacity, 48 tubes. **Each, $6.50**

15-525. WATER BATH, Wiley, Standard Size. A large bath, to operate which only a small volume of water need be heated. One ordinary Bunsen burner operates the bath.

The bath is made of copper, and is supported on a braced angle-iron support. The top of the bath measures 25 x 14½ inches, and is reinforced on the under side by triangular strips of copper to prevent sagging. The bath has 12 holes, each 3½ inches in diameter, and 2 holes, each 5¾ inches diameter. All openings are fitted with concentric copper rings and covers. The boiling chamber is a replaceable cup made of heavy spun copper, 3⅜ inches inside diameter by 3½ inches deep, and has a capacity of 250 ml. This cup is fed by a ¼-inch copper pipe and is connected to a constant level regulator. **Each, $65.00**


RED SEALING WAX
STICKS
FISHER SCIENTIFIC CO., PITTSBURGH, PA.

15-530

15-535

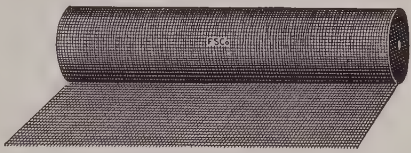
WAX, Beeswax; see Chemical and Reagent List in the rear of this catalogue.

15-530. WAX, Sealing, Red, in sticks 11 inches long. Used for sealing corks in bottles, for sealing different apparatus, and for sealing packages, samples, communications, etc. Put up in boxes of 4 sticks, weighing one (1) pound. **Per stick, $ .50**
Per pound (4 sticks), **$1.60**

15-535. WAX TAPERS, White, about ⅛ inch thick and 15 inches long; 30 tapers to a box. **Per box, $ .20**
Per dozen boxes, $1.60

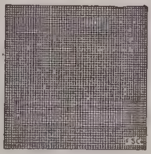
WEIGHTS, see Balance Weights, pages 56 to 60.

15-540
See also No. 15-555

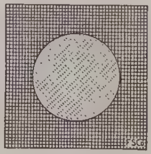


15-560
See also No. 15-570 and No. 15-575

15-545
See also No. 15-550



15-565
See also No. 15-580
and No. 15-585



15-590

15-540. WIRE, Chromel "A," free from iron. Contains 20% chromium and 80% nickel. This alloy resists oxidation more vigorously than any other base metal combination. It is the most satisfactory alloy for electrical heating elements. Minimum quantity, ½ pound.

B. & S. gauge, No.	18	20	22	24
Ohms per foot	.397	.610	.977	1.55
Number of feet per pound	219	343	549	870
Per ½ pound	**$3.00**	**3.25**	**3.75**	**4.50**
Per pound	**$4.95**	**5.40**	**6.15**	**7.20**

15-545. WIRE, Copper, Bare, on spools of ¼ pound each.

Gauge, B. & S. No.	16	18	20	22	24	26	28	30
¼-pound spool	**$ .25**	**.25**	**.25**	**.28**	**.30**	**.30**	**.35**	**.40**

½ dozen spools, 10% discount. **1 dozen spools,** 15% discount

15-550. WIRE, Iron, for Standardizing; No. 30 B. & S. gauge; contains 99.8% iron. **Per 1-ounce spool, $ .60**
Per ¼-pound spool, $1.00

15-555. WIRE, Nickel, pure; No. 14 B. & S. gauge. **Per ounce, $ .25**
Per pound, $2.50

WIRE, Platinum, see Platinum Wire, page 500.

15-560. WIRE GAUZE, Brass; for general use; in rolls 36 inches wide.

Mesh	10	20	40	60	80	100	200
Per sq. ft.	**$ .65**	**.65**	**.80**	**.95**	**1.20**	**1.60**	**6.00**

15-565. WIRE GAUZE, Brass, in squares, 20 mesh. For use under beakers, dishes, etc., when heating over a flame.

Size, inches	4x4	5x5	6x6
Each	**$ .12**	**.15**	**.25**

Dozen lots of a size, 10% discount. **Gross lots** of a size, 20% discount

15-570. WIRE GAUZE, Copper, for combustion; in rolls 36 inches wide.

Mesh	20	30	40	60	80	100
Per sq. ft.	**$ .65**	**.75**	**.80**	**.95**	**1.20**	**1.60**

15-575. WIRE GAUZE, Iron, tinned; in rolls 36 inches wide; 20 mesh. **Per sq. ft., $ .45**

15-580. WIRE GAUZE, Iron, tinned; in squares; 20 mesh. For supporting beakers, dishes, etc.

Size, inches	4x4	5x5	6x6
Each	**$ .05**	**.06**	**.09**

Dozen lots of a size, 10% discount. **Gross lots** of a size, 20% discount

15-585. WIRE GAUZE, Chromel, in squares, 16 mesh, No. 24 wire. Chromel will not rust; it has a high melting point and is very resistant to oxidation in the flame.

Size, inches	4x4	5x5	6x6
Each	**$ .45**	**.70**	**.95**
Per package of 10	**$3.80**	**6.00**	**8.50**

15-590. WIRE GAUZE, Asbestos Centers, squares; of tinned iron. For use under beakers, dishes, etc.

Size, inches	4x4	5x5	6x6
Each	**$ .10**	**.12**	**.15**

Dozen lots of a size, 10% discount. **Gross lots** of a size, 20% discount

TABLE OF

ATOMIC WEIGHTS

1924

Name	Symbol	0=16
Aluminum	Al	27.0
Antimony	Sb	120.2
Argon	A	39.9
Arsenic	As	74.96
Barium	Ba	137.37
Bismuth	Bi	209.0
Boron	B	10.9
Bromine	Br	79.92
Cadmium	Cd	112.40
Caesium	Cs	132.81
Calcium	Ca	40.07
Carbon	C	12.005
Cerium	Ce	140.25
Chlorine	Cl	35.46
Chromium	Cr	52.0
Cobalt	Co	58.97
Columbium (Niobium)	Cb	93.1
Copper	Cu	63.57
Dysprosium	Dy	162.5
Erbium	Er	167.7
Europium	Eu	152.0
Fluorine	F	19.0
Gadolinium	Gd	157.3
Gallium	Ga	70.1
Germanium	Ge	72.5
Glucinum (Beryllium)	Gl	9.1
Gold	Au	197.2
Helium	He	4.00
Holmium	Ho	163.5
Hydrogen	H	1.008
Indium	In	114.8
Iodine	I	126.92
Iridium	Ir	193.1
Iron	Fe	55.84
Krypton	Kr	82.92
Lanthanum	La	139.0
Lead	Pb	207.20
Lithium	Li	6.94
Lutetium	Lu	175.0
Magnesium	Mg	24.32
Manganese	Mn	54.93
Mercury	Hg	200.6
Molybdenum	Mo	96.0
Neodymium	Nd	144.3
Neon	Ne	20.2
Nickel	Ni	58.68
Niton (Radium Emanation)	Nt	222.4
Nitrogen	N	14.008
Osmium	Os	190.9
Oxygen	O	16.00
Palladium	Pd	106.7
Phosphorus	P	31.04
Platinum	Pt	195.2
Potassium	K	39.10
Praseodymium	Pr	140.9
Radium	Ra	226.0
Rhodium	Rh	102.9
Rubidium	Rb	85.45
Ruthenium	Ru	101.7
Samarium	Sa	150.4
Scandium	Sc	45.1
Selenium	Se	79.2
Silicon	Si	28.1
Silver	Ag	107.88
Sodium	Na	23.00
Strontium	Sr	87.63
Sulphur	S	32.06
Tantalum	Ta	181.5
Tellurium	Te	127.5
Terbium	Tb	159.2
Thallium	Tl	204.0
Thorium	Th	232.15
Thulium	Tm	169.9
Tin	Sn	118.7
Titanium	Ti	48.1
Tungsten	W	184.0
Uranium	U	238.2
Vanadium	V	51.0
Xenon	X	130.2
Ytterbium	Yb	173.5
Yttrium	Yt	89.33
Zinc	Zn	65.37
Zirconium	Zr	90.6

CHEMICALS AND REAGENTS

The following is a list of the most used chemicals and reagents; other chemicals are supplied on short notice. The prices of chemicals are continually changing and the prices given in this list were correct at the time the list was compiled; these will serve as a guide but the current price at the time the order is received, will prevail.

The prices given in this list include the containers, packing and boxing, except where otherwise noted.

ABBREVIATIONS USED

Grades

C.P. —Chemically Pure.
U.S.P. —According to the United States Pharmacopoeia.
Med. —Medicinal.
Tech. —Technical.
Coml. —Commercial.
Nat. —Native.

Forms

Cryst. —Crystals.
Anhyd. —Anhydrous.
Powd. —Powdered.
Precip. —Precipitated.
Gran. —Granular.
Sol. —Solution.

Containers

g.s.b. —Glass stoppered bottle.
c.b. —Cork stoppered bottle.
r.s.b. —Rubber stoppered bottle.
p.c. —Pasteboard carton.
pkg. —Paper package.

Quantity Units

lb. —pound.
oz. —ounce.
ml. —milliliter.
gm. —gram.

Bacteriological Culture Media and Stains are listed on pages 597 to 602 inclusive in the rear of this list.

SHIPPING REGULATIONS OF THE INTERSTATE COMMERCE COMMISSION

The shipment of each chemical must be made according to the shipping regulations of the Interstate Commerce Commission for that particular chemical. The details of these regulations are quite voluminous and are being changed from time to time.

In general, the I. C. C. Regulations provide that no inflammable, corrosive or poisonous materials can be sent by parcel post; phosphorus, sodium, potassium, carbon bisulphide, explosives, etc., can not be shipped in any quantity except by freight; acids and less harmful chemicals can be shipped by express in limited quantities; larger quantities must be shipped by freight.

In shipping chemicals we comply with the instructions given on the order in so far as the I. C. C. Regulations will permit. Orders for chemicals should be anticipated as far in advance as is practicable in order to allow for the extra time in transit required by freight shipments where required by the I. C. C. Regulations.

CHEMICALS AND REAGENTS

A

Name and Formula			Price
Acetaldehyde $CH_2.CHO$	oz.	c.b.	$ .30
	lb.	c.b.	1.10
Acetamide, cryst. $CH_3.CO.NH_2$	oz.	c.b.	$ .50
	lb.	c.b.	3.60
Acetanilide, U.S.P. $C_6H_5NH.(CO.CH_3)$	oz.	p.c.	$ .25
	lb.	p.c.	.95
Acetone, C.P. $CH_3CO.CH_3$	oz.	c.b.	$ .30
	lb.	c.b.	1.05
Acetone, pure	lb.	c.b.	$ .50
	gal.	can	2.10
Acetphenetidin, U.S.P. $C_{10}H_{13}NO_2$	oz.	c.b.	$ .50
Acetyl Acetone (B. Pt. 137–140° C.)	25 gm.	g.s.b.	$5.80
	50 gm.	g.s.b.	10.55
Acetyl Chloride, in sealed vials $CH_3.CO.CL$	¼ lb.	vial	$ .65
	lb.	vial	1.80

Acetyl Oxide, see (Acid) Acetic Anhydride

ACIDS

Name and Formula			Price
Acid Acetic, 36%, U.S.P.	lb.	g.s.b.	$ .45
	5 lb.	g.s.b., Per lb.	.35
Acid Acetic, 50%, C.P.	lb.	g.s.b.	$ .55
	5 lb.	g.s.b., Per lb.	.40
Acid Acetic, 80%, C.P.	lb.	g.s.b.	$ .75
	5 lb.	g.s.b., Per lb.	.60
Acid Acetic, 99%, glacial, U.S.P., $CH_3.COOH$	lb.	g.s.b.	$ .60
	5 lb.	g.s.b., Per lb.	.45
Acid Acetic, 99.5%, glacial, C.P.	lb.	g.s.b.	$ .90
	5 lb.	g.s.b., Per lb.	.55
Acid Acetic, 99.6–.7%, C.P., **Special** (Empyreuma Free)	lb.	g.s.b.	$1.00
	5 lb.	g.s.b., Per lb.	.70
(Acid) **Acetic,** anhydride, C.P. $(CH_3.CO)_2O$	¼ lb.	g.s.b.	$ .95
	lb.	g.s.b.	2.15
Acid Acetylsalicylic (Aspirin) $C_6H_4.O.COCH_3.COOH$	oz.	p.c.	$ .30
	lb.	p.c.	2.00
Acid Anilinesulfonic, see Acid Sulfanilic			
Acid Arsenic (anhydride) C.P. As_2O_5	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.55
Acid Arsenious, powd. (anhydride) C.P., As_2O_3	¼ lb.	c.b.	$ .45
	lb.	c.b.	.90
Acid Arsenious, powd., techn	¼ lb.	p.c.	$ .35
	lb.	p.c.	.60
Acid Benzoic, special for Calorimetry	2 oz.	g.s.b.	$ .90
Acid Benzoic, C.P., sublimed $C_6H_5CO_2H$	oz.	c.b.	$ .50
	lb.	c.b.	2.25
Acid Benzoic, from Toluene, U.S.P.	oz.	c.b.	$ .30
	lb.	c.b.	1.55

Name and Formula			Price
Acid Boric, cryst., C.P. H_3BO_3	¼ lb.	c.b.	$ .40
	lb.	c.b.	.80
Acid Boric, powd., U.S.P.	¼ lb.	p.c.	$ .25
	lb.	p.c.	.50
Acid Butyric, 60%	oz.	g.s.b.	$ .35
	¼ lb.	g.s.b.	.70
Acid Butyric, technical, absolute, $CH_3(CH_2)_2COOH$	oz.	g.s.b.	$ .45
	¼ lb.	g.s.b.	.90
Acid Carbolic, white, loose, cryst., C.P.	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.25
Acid Carbolic, fused, cryst., U.S.P., C_6H_5OH	¼ lb.	c.b.	$ .45
	lb.	c.b.	.85
Acid Carbolic, U.S.P., Liquid, 87%, (Phenol)	lb.	c.b.	$ .65
	gal.	can	3.70
Acid Chlorplatinic, see Platinic Chloride			
Acid Chromic, C.P., cryst., Acid Chromic Anhydride CrO_3	oz.	g.s.b.	$ .60
	lb.	g.s.b.	2.35
Acid Chromic, pure, 85%	¼ lb.	g.s.b.	$ .80
	lb.	g.s.b.	1.75
Acid Cinnamic (Cinnamylic) $C_6H_5.CH{=}CH.COOH$	oz.	c.b.	$ .60
Acid Citric, cryst., C.P. $C_3H_4(OH)(COOH)_3+H_2O$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
	5 lb.	c.b., Per lb.	1.50
Acid Citric, powd., C.P.	¼ lb.	c.b.	$ .85
	lb.	c.b.	2.20
Acid Citric, cryst., U.S.P.	¼ lb.	p.c.	$ .50
	lb.	p.c.	1.20
Acid Citric, powd., U.S.P.	¼ lb.	p.c.	$ .45
	lb.	p.c.	1.15
Acid Cresylic, see Cresol			
Acid Formic, 1.06, abt. 25% pure, $HCOOH$	¼ lb.	g.s.b.	$ .55
	lb.	g.s.b.	.90
Acid Formic, 1.20, abt. 85% pure	¼ lb.	g.s.b.	$ .60
	lb.	g.s.b.	1.00
Acid Gallic, powd., U.S.P. $C_6H_2(OH)_3COOH+H_2O$	¼ lb.	p.c.	$ .55
	lb.	p.c.	1.50
Acid Hydriodic, Sp. Gr. 1.70 HI	oz.	g.s.b.	$ .70
Acid Hydriodic, diluted, 10%	oz.	g.s.b.	$ .50
	lb.	g.s.b.	1.85
Acid Hydrobromic, conc., 34%, HBr	oz.	g.s.b.	$ .45
	lb.	g.s.b.	1.45

CHEMICALS AND REAGENTS

Name and Formula			Price
***Acid Hydrochloric**, 1.20, C.P. HCl	**1 lb.**	g.s.b.	$ .75
	6 lb. bottle		$ .16 per lb.
	10 6 lb. bottles		.12 per lb.
	120 lb. carboy		$ .09½ per lb.
***Acid Hydrochloric**, 20°, coml.	**6 lb.** bottle		$ .15 per lb.
	Case 10x6 lb. bottles		.10 per lb.
	120 lb. carboy		.04 per lb.
Acid Hydrochloric, Standard Solutions		g.s.b.	
Normal	per liter,		$1.75—½ liter, $1.10
½ Normal	per liter,		1.75—½ liter, 1.10
1/10 Normal	per liter,		1.75—½ liter, 1.10
Acid Hydrofluoric, C.P. HF	**1 lb.**	wax bottle	$1.65
Acid Hydrofluoric, 48%, techn.	**1 lb.**	wax bottle	$1.10
Acid Hydrofluorsilicic, C.P. H_2SiF_6	**1 lb.**	wax bottle	$1.60
Acid Hypophosphorous, 50%, U.S.P., $HP(OH)_2+Aq$	**oz.**	g.s.b.	$ .50
	¼ lb.	g.s.b.	1.10
Acid Iodic, cryst. HIO_3	**oz.**	g.s.b.	$1.30
Acid Iodic Anhydride I_2O_5	**oz.**	c.b.	$1.75
Acid Lactic, Sp. Gr. 1.20, U.S.P., $CH_3.CH(OH).COOH$	**oz.**	c.b.	$ .40
	lb.	c.b.	1.65
Acid Malic, C.P. (Inactive) $C_4H_6O_5$	**oz.**	c.b.	$ .45
	¼ lb.	c.b.	1.10
Acid Molybdic, special, 85%, Phosphorus free, tested for Iron and Steel analysis H_2MoO_4	**lb.**	c.b.	$2.55
	5 lb.	c.b.	11.50
(Acid) Molybdic Anhydride, C.P., 100%, MoO_3	**lb.**	c.b.	$3.60
Acid Monochloracetic, cryst., pure, $CH_2ClCOOH$	**oz.**	g.s.b.	$ .45
Acid Muriatic, see Acid Hydrochloric			
†**Acid Nitric**, Sp. Gr. 1.42, C.P. HNO_3	**lb.**	g.s.b.	$ .85
	7 lb. bottle		$ .26 per lb.
	10 7 lb. bottles		.19 per lb.
	140 lb. carboy		.16 per lb.
†**Acid Nitric**, 40° Be., coml.	**7 lb.** bottle		$ .22 per lb.
	Case 10x7 lb. bottles		.16 per lb.
	140 lb. carboy		.12 per lb.
Acid Nitric, fuming, Sp. Gr. 1.52, pure	**lb.**	g.s.b.	$1.10
Acid Nitric, red fuming, Sp. Gr. 1.60, C.P.	**lb.**	g.s.b.	$1.50
Acid Nitric, Standard Normal Solution		g.s.b.	
	per liter, $1.75—½ liter, $1.10		

Name and Formula			Price
Acid Nitrosonitric, see Acid Nitric, fuming			
Acid Nitroxanthic, see Acid Picric			
Acid Oleic, U.S.P., liquid $C_{18}H_{34}O_2$	**oz.**	c.b.	$ .25
	lb.	c.b.	.70
Acid Orthoboric, see Acid Boric			
Acid Orthooxybenzoic, see Acid Salicylic			
(Acid) Osmic OsO_4	**1 gm.**	vial	$6.25
Acid Oxalic, cryst., C.P. $(COOH)_2+2H_2O$	**lb.**	c.b.	$ .95
	5 lb.	c.b., Per lb.	.80
Acid Oxalic, anhyd., powd., C.P.	**¼ lb.**	c.b.	$ .80
	lb.	c.b.	2.00
Acid Oxalic, cryst., techn.	**lb.**	p.c.	$ .40
	5 lb.	p.c., Per lb.	.35
Acid Palmitic $CH_3(CH_2)_{14}CO_2H[(OH)_2]$	**4 oz.**	c.b.	$ .75
	lb.	c.b.	1.75
Acid Para-amidobenzolsulfonic, see Acid Sulfanilic			
Acid Para-anilinesulfonic, see Acid Sulfanilic			
Acid Pararosolic (Acid Rosolic), see Coralline under Stains			
Acid Perchloric, 60% solution, Sp. Gr. 1.54, C.P.	**oz.**	g.s.b.	$ .55
	lb.	g.s.b.	3.00
Acid Perchloric, 20% solution, Sp. Gr. 1.12, $HClO_4$	**oz.**	g.s.b.	$ .45
	lb.	g.s.b.	1.60
Acid Phenylformic, see Acid Benzoic			
Acid Phenylic, see Acid Carbolic			
Acid Phosphomolybdic, 10% solution, $H_3PO_4.12MoO_3$	**oz.**	g.s.b.	$ .55
	lb.	g.s.b.	2.10
Acid Phosphoric (Ortho), 85%, U.S.P., syrupy	**oz.**	g.s.b.	$ .40
	lb.	g.s.b.	.95
Acid Phosphoric (Meta), glacial, sticks, H_3PO_4	**oz.**	c.b.	$ .35
	lb.	c.b.	1.45
△**(Acid) Phosphoric Anhydride** P_2O_5	**½ lb.**	g.s.b.	$ .65
	3 lb.	tin	2.85
Acid Phosphoric (Ortho), 50%, U.S.P.	**oz.**	g.s.b.	$ .35
	lb.	g.s.b.	.85
Acid Phosphorous, Sp. Gr. 1.12, solution, H_3PO_3	**oz.**	g.s.b.	$ .40
	lb.	g.s.b.	1.20
Acid Phosphotungstic, purified cryst., $P_2O_5.12WO_3.42H_2O$	**oz.**	g.s.b.	$ .85
	lb.	g.s.b.	4.85
Acid Phosphotungstic, 10% solution	**oz.**	g.s.b.	$ .55
	lb.	g.s.b.	2.00

Prices include containers except where otherwise noted. All prices are subject to market fluctuations.

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*6 lb. g.s. bottles $ .35 each, cases $2.00 each, carboys $5.00 each, charged extra; returnable in good condition at the price charged. †7 lb. g.s. bottles $ .35 each, cases $2.00 each, carboys $5.00 each, charged extra; returnable in good condition at the price charged. △½ lb. g.s. bottle and 3 lb. tins are the containers permitted by the Interstate Commerce Commission.

CHEMICALS AND REAGENTS

Name and Formula			Price
(Acid) **Phthalic Anhydride** $C_6H_4(CO)_2O$	oz.	p.c.	$ .20
	lb.	p.c.	.80
Acid Picramic, for blood test $OH.C_6H_2(NO_2)_2NH_2$	oz.	c.b.	$1.60
***Acid Picric,** C.P., cryst., 10% water $C_6H_2OH.(NO_2)_3$		c.b.	$ .30
	¼ lb.		.65
	lb.		1.85
Cannot be shipped dry. Not more than 1 lb. in a box.			
Acid Pyrogallic, resublimed $C_6H_3(OH)_3[1:2:3]$	oz.	tin	$ .40
	¼ lb.	tin	1.00
	lb.	tin	3.00
Acid Pyrogallic, solution for gas analysis, see page 383.			
Acid Rosolic, see Coralline, under Stains			
Acid Salicylic, U.S.P. $C_7H_6O_3$	oz.	p.c.	$ .25
	lb.	p.c.	.95
Acid Silicic, C.P. SiO_2	oz.	c.b.	$ .40
	lb.	c.b.	1.60
Acid Silicofluoric, see Acid Hydrofluorsilicic			
Acid Stearic, pure, powd. $C_{17}H_{35}COOH$	lb.	p.c.	$ .60
	5 lb.	p.c., Per lb.	.55
Acid Succinic, C.P., cryst. $C_2H_4(COOH)_2$	oz.	c.b.	$ .50
	¼ lb.	c.b.	1.15
Acid Sulfanilic, C.P., cryst. $C_6H_4.SO_3H.NH_2[1:4]+2H_2O$	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.50
†**Acid Sulfuric,** Sp. Gr. 1.84, C.P.	lb.	g.s.b.	$ .75
	9 lb. bottle		$ **.16** per lb.
	Case 10x9 lb. bottles		**.12** per lb.
	180 lb. carboy		$ **.09½** per lb.
Acid Sulfuric, 66° Be., Coml.	**9 lb.** bottle		$ **.15** per lb.
	Case 10x9 lb. bottles		**.10** per lb.
	Carboy, 180 lbs.		
†**Acid Sulfuric, special,** low in Nitrogen	**9 lb.**	g.s.b.,	$ **.24** per lb.
Acid Sulfuric, Standard Solutions		g.s.b.	
Normal		**per liter**	**$1.75**
1/10 Normal		**per liter**	**1.75**
1/20 Normal		**per liter**	**1.75**
1/50 Normal		**per liter**	**1.75**
†**Acid Sulfuric,** fuming, 15 to 20% SO_3, C.P.	lb.	g.s.b.	$1.00
	9 lb. bottle		$ **.60** per lb.
Acid Sulfurous, solution, 6% SO_2, C.P., H_2SO_3	lb.	g.s.b.	$ .55
	5 lb.	g.s.b.	2.00
Acid Tannic, C.P., cryst. $C_{14}H_{10}O_9$	¼ lb.	c.b.	$ .85
	lb.	c.b.	2.15

Name and Formula			Price
Acid Tannic, U.S.P., powd.	¼ lb.	p.c.	$ .70
	lb.	p.c.	2.00
Acid Tartaric, cryst., C.P. $C_2H_2(OH)_2(COOH)_2$	oz.	c.b.	$ .30
	lb.	c.b.	1.10
Acid Tartaric, powd., C.P.	oz.	c.b.	$ .35
	lb.	c.b.	1.30
Acid Tartaric, cryst., U.S.P.	oz.	p.c.	$ .20
	lb.	p.c.	.90
Acid Trichloracetic, U.S.P.	oz.	g.s.b.	$ .70
	¼ lb.	g.s.b.	1.50
Acid Tungstic, C.P., 99.9%, powd., $H_2WO_4.WO_3$	oz.	g.s.b.	$ .70
	¼ lb.	g.s.b.	1.55
Acid Uric	25 gm.	g.s.b.	$ .85
Acid Valeric (Valerianic) Trihydrated	oz.	g.s.b.	$ .75
Acid Wolframic, see Acid Tungstic			
Agar Agar, white, shreds	lb.	pkg.	$2.80
Agar Agar, white, powd	lb.	pkg.	$4.15
Agar, Bacto, for standardizing	lb.	pkg.	$3.00
Agar, for culture media, see Culture Media			
Albumen, from Eggs, sol. powder	¼ lb.	c.b.	$1.05
	lb.	c.b.	3.10
Albumen, from Eggs, Scales	¼ lb.	c.b.	$ .95
	lb.	c.b.	2.80
Alcohol Allylic (B. Pt. 95.5–97° C.) $C_3H_5.OH$	25 gm.	g.s.b.	$2.30
	100 gm.	g.s.b.	6.80
Alcohol Amylic (Fusel Oil) pure	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.30
Alcohol Amylic, C.P. (Iso)	¼ lb.	c.b.	$ .95
	lb.	c.b.	2.40
Alcohol Benzyl, Chlorine Free (B. Pt. 92–94°, 8 mm.)	25 gm.	c.b.	$ .70
	100 gm.	c.b.	1.45
Alcohol Butylic, B. Pt. 116–118° C. $C_4H_{10}O$	25 gm.	c.b.	$ .65
	100 gm.	c.b.	1.10
Alcohol Caprylic $C_8H_{18}O$	oz.	c.b.	$1.55
Alcohol Ethylic, denatured, Formula No. 5	1 gal.	can	$1.45
Alcohol Ethylic. We have discontinued the sale of alcohols which come under the Prohibition Laws. These can be obtained from the nearest Drug House.			
Alcohol Methylic, 95%	1 gal.	can	$1.40
	5 gal. can, Per gal.		1.10
Alcohol Methylic, Absl. CH_3OH	Pt.	c.b.	$ .95
Alcohol Methylic, C.P., special (Acetone free)	lb.	c.b.	$1.20
Alcohol Wood, see Alcohol Methylic			
Alcohol Iso Propyl	100 gm.	c.b.	$ .40
Aldehyde Ethylic, see Acetaldehyde			
Aldehyde Formic, see Formaldehyde			

Prices include containers except where otherwise noted. All prices are subject to market fluctuations.

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*I. C. C. regulations. †9 lb. g.s. bottles $ .35 each, cases $2.00 each, carboys $5.00 each, charged extra; returnable in good condition at the price charged.

CHEMICALS AND REAGENTS

Name and Formula			Price
Alizarine (Dihydroxy Anthraquinone) dry $C_6H_4(CO)_2C_6H_2(OH)_2$	**25 gm.**	c.b.	**$1.70**
Alizarine Paste, about 20%	**4 oz.**	c.b.	**$ .75**
	8 oz.	c.b.	**1.00**
Alizarine Sod. Mono-Sulfonate $NaC_{14}H_5O_2(OH)_2SO_3+H_2O$	**25 gm.**	c.b.	**$2.10**
Alkalie Blue, see **Stains**			
Alloy, Devarda, for reduction, 20 mesh and finer	**oz.**	p.c.	**$ .45**
	lb.	p.c.	**2.40**
Alloy, Fusible Rose's	**oz.**	tin	**$ .45**
	lb.	tin	**3.70**
Alloy, Fusible Wood's	**oz.**	tin	**$ .45**
	lb.	tin	**3.90**
Alum, see Aluminum Potass. Sulfate			
Alum, Ammonia, see Alumin. Ammon. Sulfate			
Alum, Chrome, see Chrom. and Potass. Sulfate			
Alum, Sodium, see Aluminum Sodium Sulfate			
Alumina, Levigated, see page 439			
Aluminum Metal, foil, .002 inch, 11 inch wide	**¼ lb.**	roll	**$ .45**
	lb.	roll	**1.30**
Aluminum Metal, granular, 8 mesh	**¼ lb.**	p.c.	**$ .30**
	lb.	p.c.	**.80**
Aluminum Metal, finest powder (Bronze)	**¼ lb.**	p.c.	**$ .55**
	lb.	p.c.	**1.60**
Aluminum Metal, pellets	**¼ lb.**	p.c.	**$ .35**
	lb.	p.c.	**.85**
Aluminum Metal, sheet, 12x12 inches	**1/32 inch thick,**	Per lb.	**$ .90**
	1/16 inch thick,	Per lb.	**.80**
	⅛ inch thick,	Per lb.	**.80**
Aluminum Metal, turnings	**lb.**	p.c.	**$ .60**
Aluminum Acetate, C.P., Basic, powd. $Al_2O(C_2H_3O_2)_4+4H_2O$	**oz.**	c.b.	**$ .40**
	lb.	c.b.	**1.80**
Aluminum Ammon. Sulfate, coml.	**lb.**	p.c.	**$ .30**
Aluminum Ammon. Sulfate, C.P., cryst. $Al_2(NH_4)_2(SO_4)_4+24H_2O$	**lb.**	c.b.	**$ .60**
Aluminum Chloride, cryst., C.P., $Al_2Cl_6+12H_2O$	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**1.15**
Aluminum Chloride, anhyd. C.P., Al_2Cl_6	**¼ lb.**	c.b.	**$ .80**
	lb.	c.b.	**1.75**
Aluminum Chloride, pure crystals, Al_2Cl_6	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**.95**
Aluminum Fluoride, powd., C.P., Al_2F_6	**¼ lb.**	c.b.	**$ .85**
	lb.	c.b.	**1.85**
Aluminum Hydroxide, powd., C.P., $Al_2(OH)_6$	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**1.00**

Name and Formula			Price
Aluminum Hydroxide, pure	**¼ lb.**	c.b.	**$ .35**
	lb.	c.b.	**.60**
Aluminum Nitrate, cryst., C.P., $Al_2(NO_3)_6+18H_2O$	**¼ lb.**	c.b.	**$ .55**
	lb.	c.b.	**1.30**
Aluminum Oxide, C.P., ignited, Al_2O_3	**¼ lb.**	tin	**$ .55**
	lb.	tin	**1.30**
Aluminum Oxide, pure, ignited	**lb.**	tin	**$.40**
	5 lb.	tin, Per lb.	**.30**
Aluminum Palmitate, pure $Al_2(C_{16}H_{31}O_2)_6$	**oz.**	c.b.	**$ .25**
	lb.	c.b.	**1.00**
Aluminum Phosphate, C.P. $Al_2(PO_4)_2$	**oz.**	c.b.	**$ .40**
	lb.	c.b.	**1.80**
Aluminum Potass. Sulfate, cryst., C.P. $Al_2K_2(SO_4)_4+24H_2O$	**lb.**	c.b.	**$ .75**
	5 lb.	c.b., Per lb.	**.65**
Aluminum Potass. Sulfate, U.S.P. (Alum), $Al_2K_2(SO_4)_4$	**lb.**	p.c.	**$ .20**
	5 lb.	p.c., Per lb.	**.15**
Aluminum Sodium Sulfate, cryst., C.P. $Al_2Na_2(SO_4)_4+24H_2O$	**oz.**	c.b.	**$ .30**
	lb.	c.b.	**1.15**
Aluminum Sodium Sulfate, anhyd., C.P.	**oz.**	c.b.	**$ .40**
	lb.	c.b.	**1.55**
Aluminum Sulfate, cryst., C.P., $Al_2(SO_4)_3+18H_2O$	**lb.**	c.b.	**$ .75**
	5 lb.	c.b., Per lb.	**.60**
Aluminum Sulfate, anhyd., C.P.	**¼ lb.**	c.b.	**$ .65**
	lb.	c.b.	**1.50**
Aluminum Sulfate, techn.	**lb.**	p.c.	**$ .20**
	5 lb.	p.c., Per lb.	**.15**
Alundum, 46, 60 and 90 mesh, see page 256			
Alundum cement, see page 146			
Ammonia, see Ammonium Hydroxide			
Ammonia Alum, see Alumin. Ammon. Sulfate			
Ammonium Acetate, cryst., C.P., CH_3COONH_4	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**1.05**
Ammonium Bicarbonate, powd., C.P., NH_4HCO_3	**¼ lb.**	c.b.	**$ .40**
	lb.	c.b.	**.75**
Ammonium Bichromate, cryst., C.P., $(NH_4)_2Cr_2O_7$	**¼ lb.**	c.b.	**$ .55**
	lb.	c.b.	**1.35**
Ammonium Bifluoride, cryst., C.P.	**¼ lb.**	c.b.	**$ .70**
	lb.	c.b.	**1.75**
Ammonium Bisulfate, cryst., C.P., $NH_4.HSO_4$	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**1.00**
Ammonium Bisulfite, cryst., C.P.	**oz.**	c.b.	**$ .40**
	lb.	c.b.	**2.60**
Ammonium Bisulfite, conc. solution, C.P.	**lb.**	g.s.b.	**$1.00**
	5 lb.	g.s.b., Per lb.	**.70**

CHEMICALS AND REAGENTS

Name and Formula			Price
Ammonium Borate, cryst., C.P., $(NH_4.HB_4O_7)+3H_2O$	**¼ lb.**	c.b.	$ .55
	lb.	c.b.	1.35
Ammonium Bromide, C.P. NH_4Br	**¼ lb.**	c.b.	$ .50
	lb.	c.b.	1.15
Ammonium Carbonate, lumps, C.P., $(NH_4)_2CO_3H_2O$	**lb.**	c.b.	$ .75
	5 lb.	c.b., Per lb.	.60
Ammonium Carbonate, lumps, U.S.P.	**lb.**	tin	$ .50
	5 lb.	tin, Per lb.	.40
Ammonium Chloride, gran., cryst., C.P., NH_4Cl	**lb.**	c.b.	$ .75
	5 lb.	c.b., Per lb.	.60
Ammonium Chloride, C.P., special, hydrocarbon free	**¼ lb.**	c.b.	$ .50
	lb.	c.b.	1.10
Ammonium Chloride, lump (Sal-Ammoniac)	**lb.**	p.c.	$ .30
	5 lb.	p.c., Per lb.	.25
Ammonium Chloride, gran., techn	**lb.**	p.c.	$ .25
	5 lb.	p.c., Per lb.	.20
Ammonium Chromium Sulfate, C.P., crystals	**oz.**	c.b.	$ .30
	lb.	c.b.	.95
Ammonium Citrate, cryst., C.P., $(NH_4)_2C_6H_6O_7$	**oz.**	c.b.	$ .50
	lb.	c.b.	2.15
Ammonium Fluoride, C.P. NH_4F	**½ lb.**	wax. bot.	$1.45
*__Ammonium Hydroxide,__ Sp. Gr. .90, conc., C.P., NH_4OH	**lb.**	g.s.b.	$ .85
	4 lb.	g.s.b.	$ .26 per lb.
	Case 10x4 lb.	bottles,	.19 per lb.
	80 lb.	carboy	.16 per lb.
Ammonium Hydrosulfide, light, $(NH_4)HS$	**lb.**	g.s.b.	$ .75
	5 lb.	g.s.b., Per lb.	.50
Ammonium Hydrosulfide, dark	**lb.**	g.s.b.	$ .75
	5 lb.	g.s.b., Per lb.	.50
Ammonium Molybdate, C.P., crystals, $(NH_4)_6Mo_7O_{24}+4H_2O$	**¼ lb.**	c.b.	$ .90
	½ lb.	c.b.	1.50
	lb.	c.b.	2.60
Ammonium Molybdate, HNO_3 solution, C.P.	**lb.**	g.s.b.	$1.65
	5 lb.	g.s.b.	7.75
Ammonium Muriate, see Ammon. Chloride			
Ammonium Nitrate, C.P. NH_4NO_3	**¼ lb.**	c.b.	$ .45
	lb.	c.b.	1.00
	5 lb.	c.b., Per lb.	.80
Ammonium Nitrate, pure	**lb.**	p.c.	$ .50
	5 lb.	p.c.	2.00
Ammonium Nitrite, liquid NH_4NO_2	**lb.**	c.b.	$1.20
Ammonium Oxalate, C.P. $(NH_4)_2C_2O_4+H_2O$	**lb.**	c.b.	$ .30
	lb.	c.b.	1.30

Name and Formula			Price
Ammonium Persulfate, F. S. Co. special for Manganese determinations $(NH_4)_2S_2O_8$	**lb.**	c.b.	$ .95
	5 lb.	c.b., Per lb.	.80
Ammonium Persulfate, Merck, C.P.	**lb.**	c.b.	$1.10
	5 lb.	c.b.,	$ .95 per lb.
Ammonium Persulfate, J. T. B., C.P.	**lb.**	c.b.	$1.10
	5 lb.	c.b.,	$ .95 per lb.
Ammonium Phosphate, Dibasic (secondary), C.P. $(NH_4)_2HPO_4$	**lb.**	c.b.	$1.30
	5 lb.	c.b., Per lb.	1.15
Ammonium Phosphate, Primary, C.P., $NH_4H_2PO_4$	**lb.**	c.b.	$1.45
	5 lb.	c.b., Per lb.	1.25
Ammonium Phosphate, coml., Monobasic, 98%	**lb.**	p.c.	$ .50
	5 lb.	p.c., Per lb.	.40
Ammonium Phosphomolybdate, powd., C.P. $2(NH_4)_3PO_4+12MoO_3$	**oz.**	c.b.	$1.05
	¼ lb.	c.b.	2.60
Ammonium Sodium Phosphate, see Sodium Ammonium Phosphate			
Ammonium Sulfate, C.P. $(NH_4)_2SO_4$	**lb.**	c.b.	$ .65
	5 lb.	c.b., Per lb.	.50
Ammonium Sulfate, techn.	**lb.**	p.c.	$ .20
	5 lb.	p.c., Per lb.	.15
Ammonium Sulfide, see Ammon. Hydrosulfide			
Ammonium Sulfite, cryst., C.P., $(NH_4)_2SO_3+H_2O$	**lb.**	c.b.	$1.30
Ammonium Sulfocyanide, C.P. (Thiocyanate) $(NH_4)SCN$	**oz.**	c.b.	$ .40
	lb.	c.b.	1.65
Ammonium Tartrate, cryst., C.P., $(NH_4)_2C_4H_4O_6$	**oz.**	c.b.	$ .45
	lb.	c.b.	1.85
Ammonium Thiocyanate, see Ammon. Sulfocyanide			
Ammonium Vanadate NH_4VO_3	**oz.**	c.b.	$1.10
Amylene, practical	**100 gm.**	vial	$2.95
Amyl Acetate (Pear Oil), pure $C_7H_{14}O_2$	**pt.**	c.b.	$1.25
	gal.	can	7.40
Amyl Hydrate, see Alcohol Amylic			
Aniline, C.P. $C_6H_5NH_2$	**lb.**	c.b.	$ .95
Aniline, pure	**lb.**	c.b.	$ .85
	5 lb.	c.b., Per lb.	.70
Aniline Blue, see Stains			
Aniline Red, see Stains			

Prices include containers except where otherwise noted. **All prices are subject to market fluctuations.**

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*4 lb. g.s. bottles $ .35 each, cases $2.00 each, carboys $5.00 each, charged extra; returnable in good condition at the price charged.

CHEMICALS AND REAGENTS

Name and Formula			Price
Aniline Hydrochloride, C.P. $C_6H_5NH_2.HCl$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.25
Aniline Oil, see Aniline, pure			
Aniline Salt, see Aniline Hydrochloride			
Aniline Sulfate, powd., C.P. $(C_6H_5NH_2)_2.H_2SO_4$	¼ lb.	c.b.	$ .50
	lb.	c.b.	1.10
Aniline Dyes, see Stains			
Anthracene, 40%, techn	oz.	c.b.	$ .25
	lb.	c.b.	.70
Antiformin, med	lb.	c.b.	$1.15
Antimony Metal, lumps Sb	1 lb.	pkg.	$ .45
Antimony Metal, powd	lb.	pkg.	$ .55
Antimony Anhydride, see Antimony (ic) Oxide			
Antimony (ic) **Chloride, Penta.,** liquid, C.P., $SbCl_5$	lb.	g.s.b.	$1.85
Antimony (ous) **Chloride,** (Tri) cryst., C.P., $SbCl_3$	lb.	g.s.b.	$1.55
Antimony (ic) **Oxide** (Penta) C.P., Sb_2O_5	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Antimony (ous) **Oxide** (Tri) C.P., Sb_2O_3	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35
Antimony Potass. Tartrate, Tartar Emetic, cryst., C.P. $2C_4H_4O_6K(SbO)+H_2O$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.65
Antimony Potass. Tartrate, U.S.P. (Tartar Emetic)	lb.	c.b.	$ .90
Antimony Sulfate, powd., C.P. $Sb_2(SO_4)_3$	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.60
Antimony (ous) **Sulfide** (Tri) black, C.P., Sb_2S_3	¼ lb.	c.b.	$ .80
	lb.	c.b.	2.25
Antimony (ic) **Sulfide** (Penta) yellow, C.P., Sb_2S_5	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.60
Aqua Ammonia, see Ammon. Hydroxide			
Aqua Fortis, see Acid Nitric			
Argols, see Potass. Bitartrate			
Arrowroot, see Starch			
Arsenic Metal, lump As	¼ lb.	tin	$ .55
	lb.	tin	1.30
Arsenic Metal, powd	¼ lb.	c.b.	$ .80
	lb.	c.b.	1.95
Arsenic Chloride $AsCl_3$	¼ lb.	g.s.b.	$ .75
	lb.	g.s.b.	1.55
Arsenic (ous) **Oxide,** see Acid Arsenious			
Arsenic (ic) **Oxide,** see Acid Arsenic			

Name and Formula			Price
Asbestos, special **Gooch Filtering,** washed in acid	lb.	p.c.	$3.00
Asbestos, Grade A, short fibre, washed in acid	lb.	p.c.	$3.50
Asbestos, Grade A, long fibre, washed in acid	lb.	p.c.	$4.00
Asbestos, Grade C, woolly, medium fibre, acid washed	lb.	p.c.	$2.00
Asbestos, Grade D, woolly, short fibre, acid washed	lb.	p.c.	$1.50
Asbestos, platinized, 5%	oz.	vial,	at market price
Ascarite, see page 251			
Asphaltum Varnish, for acid-proofing	pt.	c.b.	$ .80
	gal.	can	3.75
Asphaltum, Egyptian	oz.	c.b.	$ .30
Azolitmin (indicator) $C_7H_7NO_4$	½ oz.	c.b.	$2.60
Azure, see **Stains**			

B

Name and Formula			Price
Bacteriological Culture Media, see special list in the rear			
Balsam, Canada, in Xylol	oz.	c.b.	$ .45
	lb.	c.b.	3.30
Balsam Fir	¼ lb.	c.b.	$ .45
	lb.	c.b.	.90
Barium Acetate, cryst., C.P. $Ba(C_2H_3O_2)_2+H_2O$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.40
Barium Carbonate, powd., C.P., $BaCO_3$	lb.	c.b.	$1.05
	5 lb.	c.b., Per lb.	.95
Barium Carbonate, techn., precip	lb.	p.c.	$ .20
	5 lb.	p.c., Per lb.	.17
Barium Chlorate, cryst., C.P. $Ba(ClO_3)_2+H_2O$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35
Barium Chloride, cryst., C.P. $BaCl_2+2H_2O$	lb.	c.b.	$ .75
Barium Chloride, anhyd., C.P.	lb.	c.b.	$1.25
Barium Chloride, coml	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.15
Barium Chromate, C.P. $BaCrO_4$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.45
Barium Dioxide, powd., C.P. BaO_2	¼ lb.	c.b.	$ .45
	lb.	c.b.	.90
Barium Hydroxide, cryst., C.P., $Ba(OH)_2+8H_2O$	¼ lb.	c.b.	$ .40
	lb.	c.b.	.70
Barium Hydroxide, anhyd., C.P.	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35

CHEMICALS AND REAGENTS

Name and Formula			Price
Barium Hydroxide, cryst., techn.	lb.	p.c.	$ .35
	5 lb.	p.c., Per lb.	.30
Barium Nitrate, cryst., C.P. $Ba(NO_3)_2$	¼ lb.	c.b.	$ .50
	lb.	c.b.	.95
Barium Oxide, powd., C.P. BaO	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35
Barium Peroxide, see Barium Dioxide			
Barium Sulfate, powder, C.P. $BaSO_4$	¼ lb.	c.b.	$ .45
	lb.	c.b.	.90
Barium Sulfate, techn.	lb.	p.c.	$ .20
	5 lb.	p.c., Per lb.	.17
Barium Sulfide, pure BaS	lb.	c.b.	$ .85
Bauxite	lb.	pkg.	$ .15
	5 lb.	pkg., Per lb.	.10
Barytes, see Barium Sulfate			
Beef Extract	2 oz.	jar	$ .75
	4 oz.	jar	1.30
Beef Bacto, see Culture Media			
Beeswax, see Wax			
Benedict Solution, Qualitative	8 oz.	c.b.	$1.25
	Liter	c.b.	3.25
Benedict Solution, Quantitative	8 oz.	c.b.	$1.50
	Liter	c.b.	4.50
Benzaldehyde (Oil bitter almonds artif.), $C_6H_5.COH$	¼ lb.	c.b.	$1.00
	lb.	c.b.	3.10
Benzidine, for blood work $NH_2.(C_6H_4)_2.NH_2$	oz.	c.b.	$1.35
Benzine (Naphtha) 59°	gal.	can	$ .85
	5 gal.	can, Per gal.	.60
Benzoic Acid, see Acid Benzoic			
Benzol (Benzene) 90%, techn.	gal.	can	$1.00
	5 gal.	can, Per gal.	.80
Benzol (Benzene) purified, Thiophene free, C_6H_6	gal.	c.b.	$1.40
Benzopurpurin, see **Stains**			
Benzoylchloride, M.Pt.O.5° C. $C_6H_5.CO.Cl$	100 gm.	g.s.b.	$1.65
	500 gm.	g.s.b.	5.45
Benzoyl Chloride, tech.	500 gm.	g.s.b.	$3.70
	1000 gm.	g.s.b.	6.15
Benzoyl Hydride, see Benzaldehyde			
Benzyl Alcohol, see **Alcohol, Benzyl**			
Benzyl Chloride, $C_6H_5CH_2Cl$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.40
Biebricht Scarlet, see **Stains**			

Name and Formula			Price
Bismark Brown, see **Stains**			
Bile, Lactose Peptone, see Culture Media			
Bismuth Metal, lumps, 98%, Bi	¼ lb.	p.c.	$1.55
	lb.	p.c.	4.90
Bismuth Metal, gran., 98%	¼ lb.	p.c.	$1.45
	lb.	p.c.	4.75
Bismuth Chloride, cryst., C.P., $BiCl_3$	oz.	c.b.	$ .55
	lb.	c.b.	5.65
Bismuth Nitrate, cryst, C.P., $Bi(NO_3)_3+5H_2O$	¼ lb.	c.b.	$1.40
	lb.	c.b.	4.00
Bismuth Oxide, powd., C.P., Bi_2O_3	¼ lb.	c.b.	$1.80
	lb.	c.b.	5.65
Bismuth Subnitrate, C.P., $BiONO_3.H_2O$	oz,	c.b.	$ .55
	lb.	c.b.	5.00
Black Lead, see Graphite			
Bleaching Powder, see Calc. hypochlorite			
Blood Serum, see **Culture Media**, page 600			
Blue Vitriol, see Copper Sulfate			
Bone Ash	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.17
Bone Black, see Charcoal, Animal			
Borax, see Sodium Borate			
Borax Glass, see Sodium Borate, fused			
Brilliant Green, see **Stains**			
Brimstone, see Sulphur roll			
Brom Cresol Purple, see **Stains**			
Bromine, Br.	oz.	g.s.b.	$ .50
	¼ lb.	g.s.b.	.75
	½ lb.	g.s.b.	1.10
	lb.	g.s.b.	1.65
Bromobenzene	¼ lb.	c.b.	$ .95
	lb.	c.b.	2.90
Bromoform, U.S.P., Br_3CH	¼ lb.	c.b.	$1.05
	lb.	c.b.	3.35
Brom Phenol Blue, see **Stains**			
Brom Thymol Blue, see **Stains**			
Broths, Bacto, see Culture Media			
Butyl Alcohol, see **Alcohol, Butyl**			
Buffer Solutions, see page 199			

C

Name and Formula			Price
Cadmium Metal, sticks, Cd.	lb.	pkg.	$1.50
Cadmium Metal, powd.	lb.	c.b.	$2.15
Cadmium Metal, mossy	lb.	tin	$1.90

Prices include containers except where otherwise noted. **All prices are subject to market fluctuations.**

CHEMICALS AND REAGENTS

Name and Formula			Price
Cadmium Acetate, C.P., $Cd(C_2H_3O_2)_2+3H_2O$	oz.	c.b.	$ .50
Cadmium Bromide, C.P., $CdBr_2+4H_2O$	oz.	c.b.	$ .40
Cadmium Carbonate, powd., C.P., $CdCO_3$	¼ lb.	c.b.	$ .95
	lb.	c.b.	2.45
Cadmium Chloride, cryst., C.P., $CdCl_2+2H_2O$	lb.	c.b.	$1.95
Cadmium Chloride, anhydr., C.P.	lb.	c.b.	$2.70
Cadmium Nitrate, cryst., C.P., $Cd(NO_3)_2+4H_2O$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Cadmium Oxide, C.P., CdO	oz.	c.b.	$ .55
Cadmium Sulfate, cryst., C.P., $3CdSO_4+8H_2O$	¼ lb.	c.b.	$1.00
	lb.	c.b.	2.95
Cadmium Sulfide, C.P., CdS	¼ lb.	c.b.	$1.85
Caffeine, U.S.P., $C_8H_{10}N_4O_2+H_2O$	oz.	c.b.	$ .65
Calcite	lb.	p.c.	$ .45
Calcium Metal, Ca	oz.	c.b.	$ .70
	¼ lb.	c.b.	2.30
Calcium Acetate, C.P., $Ca(C_2H_3O_2)_2$	¼ lb.	c.b.	$ .50
	lb.	c.b.	1.15
Calcium Carbide, CaC_2	2 lb.	tin, Per lb.	$ .25
Calcium Carbonate, powd., C.P., $CaCO_3$	lb.	c.b.	$1.20
	5 lb.	c.b., Per lb.	1.00
Calcium Carbonate, precipitated chalk	lb.	pkg.	$ .25
	5 lb.	pkg., Per lb.	.20
Calcium Carbonate, Marble Chips	5 lb.	pkg., Per lb.	$ .10
	25 lb.	pkg., Per lb.	.06
Calcium Carbonate, marble dust	5 lb.	pkg., Per lb.	$ .10
Calcium Carbonate (for Standardizing), Iceland Spar, see Iceland Spar			
Calcium Chloride, anhydrous, for desiccators	lb.	c.b.	$ .55
	5 lb.	c.b., Per lb.	.45
Calcium Chloride, cryst., C.P., $CaCl_2+6H_2O$	lb.	c.b.	$ .70
	5 lb.	c.b., Per lb.	.55
Calcium Chloride, fused, gran., C.P. (dry cryst.)	lb.	c.b.	$ .80
Calcium Chloride, anhydr. sticks, C.P., $CaCl_2$	lb.	c.b.	$1.00
Calcium Chloride, anhydr. gran., C.P., for drying tubes 4–8–12 or 20 mesh (specify mesh)	lb.	c.b.	$1.00
	5 lb.	c.b., Per lb.	.85

Name and Formula			Price
Calcium Chloride, gran. com'l., 75%	5 lb.	tin, Per lb.	$ .10
	25 lb.	tin, Per lb.	.08
Calcium Chromate, C.P., $CaCrO_4+2H_2O$	¼ lb.	c.b.	$1.10
	lb.	c.b.	3.30
Calcium Fluoride, native powder (Fluorspar)	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.10
Calcium Fluoride, C.P., CaF_2	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.50
Calcium Formate, $Ca(CHO_2)_2$	oz.	c.b.	$ .55
	lb.	c.b.	2.40
Calcium Hydroxide, powd., Pure, $Ca(OH)_2$	lb.	c.b.	$ .75
	5 lb.	c.b., Per lb.	.60
Calcium Hydroxide, powd., slacked lime	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.10
Calcium Hypochlorite, C.P., $Ca(ClO)_2+H_2O$	lb.	c.b.	$ .85
Calcium Hypochlorite, techn. (Bleaching Powder)	12 oz.	tin	$ .25
	10 lb.	tin	1.30
Calcium Lactate, powd., U.S.P., $Ca(C_3H_5O_3)_2+5H_2O$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35
Calcium Nitrate, cryst., C.P., $Ca(NO_3)_2$	¼ lb.	c.b.	$ .45
	lb.	c.b.	1.00
Calcium Oxalate, powd., C.P.	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.75
Calcium Oxide, powd., C.P., CaO	lb.	c.b.	$ .95
	5 lb.	c.b., Per lb.	.85
Calcium Oxide, from marble	lb.	pkg.	$ .55
	5 lb.	pkg., Per lb.	.50
Calcium Oxide, Com'l. (unslaked lime)	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.10
Calcium Oxychlorite, see Calc. Hypochlorite			
Calcium Phosphate, crude, see Bone Ash			
Calcium Phosphate, primary C.P., $CaH_2PO_4+H_2O$	lb.	c.b.	$1.45
	5 lb.	c.b., Per lb.	1.25
Calcium Phosphate, secondary C.P., $CaHPO_4+H_2O$	lb.	c.b.	$1.15
	5 lb.	c.b., Per lb.	1.10
Calcium Phosphate, tertiary C.P., $Ca_3(PO_4)_2$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.45
Calcium Phosphide, pure, Ca_3P_2	¼ lb.	c.b.	$1.10
	lb.	c.b.	3.40
Calcium Sulfate, C.P., $CaSO_4+2H_2O$	lb.	c.b.	$ .75
	5 lb.	c.b., Per lb.	.60
Calcium Sulfate, anhydr. C.P.	lb.	c.b.	$ .75
Calcium Sulfate (Gypsum), native powder	lb.	pkg.	$ .40
	5 lb.	pkg., Per lb.	.35

CHEMICALS AND REAGENTS

Name and Formula			Price
Calcium Sulfate, calcinated (Plaster Paris)	**lb.**	pkg.	**$ .15**
	5 lb.	pkg., Per lb.	**.10**
Calcium Sulfide, luminous	**oz.**	c.b.	**$ .50**
	½ lb.	c.b.	**2.05**
Calcium Sulfide, cubes, Tech.	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**.85**
Calomel, see Mercury (ous) chloride			
Camphor, gum, $C_{10}H_{16}O$	**¼ lb.**	pkg.	**$ .65**
	lb.	pkg.	**1.90**
Carbamid (see Urea)			
Carbol Fuchsin, see **Stains**			
Carbon Disulfide, C.P., CS_2	**lb.**	c.b.	**$ .70**
	5 lb.	c.b., Per lb.	**.55**
Carbon Disulfide, Tech.	**lb.**	c.b.	**$ .60**
	5 lb.	c.b., Per lb.	**.45**
Carbon Tetrachloride, C.P., CCl_4	**lb.**	c.b.	**$ .80**
	5 lb.	c.b., Per lb.	**.65**
Carbon Tetrachloride, Techn.	**lb.**	c.b.	**$ .35**
	gal.	can	**2.10**
	5 gal.	can, Per gal.	**1.85**
Carborundum, cryst., SiC	**lb.**	pkg.	**$ .50**
Carborundum, powd., 100 mesh	**lb.**	pkg.	**$ .50**
	5 lb.	pkg., Per lb.	**.40**
Carmine, see **Stains**			
Casein, Techn.	**lb.**	p.c.	**$ .50**
	5 lb.	p.c., Per lb.	**.45**
Caustic Potash, see Potassium Hydroxide			
Caustic Soda, see Sodium Hydroxide			
Celloidin, thin sheet	**40 gm.**	tin	**$1.50**
Cellulose Acetate	**¼ lb.**	c.b.	**$1.20**
	lb.	c.b.	**3.70**
Cements, see page 146			
Ceresin Black (Ozokerite)	**lb.**	pkg.	**$ .65**
Ceresin White	**lb.**	pkg.	**$ .65**
Ceresin Yellow	**lb.**	pkg.	**$ .45**
Cerium Chloride, C.P., $Ce_2Cl_6+14H_2O$	**oz.**	c.b.	**$1.10**
Cerium Nitrate, $Ce_2(NO_3)_6+12H_2O$	**oz.**	c.b.	**$ .95**
Charcoal, Activated, see page 184			
Charcoal sticks, see page 74			
Charcoal Animal (bone black)	**lb.**	pkg.	**$ .30**
	5 lb.	pkg., Per lb.	**.25**

Name and Formula			Price
Charcoal Animal treated with acid, moist	**lb.**	c.b.	**$1.00**
Charcoal, Blood, C.P.	**¼ lb.**	c.b.	**$ .90**
	lb.	c.b.	**2.30**
Charcoal, Willow, powd.	**lb.**	pkg.	**$ .20**
	5 lb.	pkg., Per lb.	**.15**
Charcoal, Wood, egg-size lump	**lb.**	pkg.	**$ .20**
	5 lb.	pkg., Per lb.	**.15**
China Clay, see Kaoline			
Chloralhydrate, cryst., $CCl_3.CH(OH)_2$	**¼ lb.**	g.s.b.	**$ .70**
	lb.	g.s.b.	**1.70**
Chloresterol, Bacto, see **Culture Media**			
Chlorinated Lime, see Calc. hypochlorite			
Chlorine Water, B. L. Reagent	**¼ lb.**	c.b.	**$ .70**
	lb.	c.b.	**1.75**
Chloroform, pure, U.S.P.	**lb.**	c.b.	**$ .95**
	5 lb.	c.b., Per lb.	**.80**
Chloroform, purif. for anæsthesia, Squibbs	**lb.**	c.b.	**$1.85**
Cholesterin	**10 gm.**	c.b.	**$1.90**
	oz.	c.b.	**4.90**
Chrome Alum, see Chrom. Potass. sulfate			
Chrome Green, see Chrom. oxide			
Chrome Yellow, see Lead chromate ppt.			
Chromium Metal, carbon free, Cr	**¼ lb.**	pkg.	**$ .75**
	lb.	pkg.	**$2.20**
Chromium Ammon. Sulfate, see Ammonium Chromium Sulfate			
Chromium (ic) **Chloride,** cryst., C.P., $Cr_2Cl_6+H_2O$	**oz.**	c.b.	**$ .50**
	½ lb.	c.b.	**1.45**
Chromium (ic) **Chloride** solut. 50%, C.P.	**lb.**	g.s.b.	**$1.65**
Chromium Nitrate, gran., C.P., $Cr(NO_3)_3$	**¼ lb.**	c.b.	**$ .85**
	lb.	c.b.	**2.15**
Chromium Nitrate solut. 40%, C.P.	**¼ lb.**	g.s.b.	**$ .65**
	lb.	g.s.b.	**1.55**
Chromium Oxide, C.P., Cr_2O_3	**¼ lb.**	c.b.	**$ .75**
	lb.	c.b.	**$1.85**
Chromium Phosphate tri (see Acid chromic)			
Chromium Potass. Sulfate (Chromic alum), cryst., C.P. $Cr_2K_2(SO_4)_4+24H_2O$	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**1.15**

CHEMICALS AND REAGENTS

Name and Formula			Price
Chromium Sulfate, dry, C.P., Cr $(SO_4)_3$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Chromium Sulfate 30% solut. C.P.	lb.	g.s.b.	$1.15
Chrysodine, see **Stains**			
Cinchonine Alkaloid, $C_{19}H_{22}N_2O$	oz.	c.b.	$ .90
Cinchonine Hydrochloride, $C_{19}H_{22}N_2O.HCl+2H_2O$	oz.	c.b.	$ .95
Cinnibar, see Mercuric Sulfide			
Cobalt Metal cubes, Co	oz.	c.b.	$ .70
Cobalt Acetate, C.P., $Co(C_2H_3O_2)_2+4H_2O$	oz.	c.b.	$ .50
Cobalt Chloride, C.P., $CoCl_2+6H_2O$	¼ lb.	c.b.	$1.00
	lb.	c.b.	3.00
Cobalt Chloride, special, nickel free	oz.	c.b.	$ .75
	lb.	c.b.	7.45
Cobalt Nitrate, C.P., $Co(NO_3)_2+6H_2O$	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.60
Cobalt Nitrate, C.P., 10% Solution	¼ lb.	c.b.	$ .45
	lb.	c.b.	1.00
Cobalt Oxide, black, C.P., Co_2O_3	oz.	c.b.	$ .55
	lb.	c.b.	4.85
Cobalt Sulfate, cryst., C.P., $CoSO_4+7H_2O$	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.60
Cochineal, bugs	¼ lb.	tin	$ .55
	lb.	tin	1.30
Cochineal powd.	oz.	c.b.	$ .35
	lb.	c.b.	1.35
Collodion, U.S.P.	lb.	c.b.	$ .80
Collodion, flexible, U.S.P.	lb.	c.b.	$ .85
Collodion, shredded, see **Parlodion**			
Colophony, see Rosin			
Columbian Spirit, see Alcohol Methylic			
Congo Red, see **Stains**			
Copper Metal, gran., Cu	lb.	pkg.	$ .55
Copper Metal, foil, thin, .002 inch	¼ lb.	pkg.	$ .50
	lb.	pkg.	1.45
Copper Metal, Precipitated powd.	oz.	c.b.	$ .45
	lb.	c.b.	2.15
Copper Metal, sheet, .010 inch	lb.	pkg.	$ .70
Copper Metal, sheet, .032 inch (1/32)	lb.	pkg.	$ .55

Name and Formula			Price
Copper Metal, turnings	lb.	pkg.	$ .40
	5 lb.	pkg., Per lb.	.35
Copper Acetate (ic), cryst., C.P., $Cu(CH_3O_2)_2+H_2O$	¼ lb.	c.b.	$ .65
	lb.	c.b.	$1.60
Copper Ammon. Chloride, C.P., $CuCl_2.2NH_4Cl+2H_2O$	lb.	c.b.	$1.05
Copper Ammon. Chloride solution for gas analysis, see page 383			
Copper Bichloride, see Copper (ic) Chloride			
Copper Bromide (ic), cryst., C.P., $CuBr_2$	¼ lb.	c.b.	$1.10
	lb.	c.b.	2.95
Copper Bromide (ous), C.P.	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.60
Copper Carbonate, powd., C.P., $CuCO_3+Cu(OH)_2$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.45
Copper Carbonate, coml., powd	lb.	tin	$ .70
	5 lb.	tin, Per lb.	.65
Copper (ic) **Chloride**, cryst., C.P., $CuCl_2+2H_2O$	lb.	c.b.	$1.05
	5 lb.	c.b., Per lb.	.95
Copper (ic) **Chloride**, anhydr., C.P.	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.45
Copper (ous) **Chloride**, C. P. Cu_2Cl_2	lb.	c.b.	$1.60
	5 lb.	c.b., Per lb.	1.50
Copper Chloride (ous) solution for gas analysis, see page 383			
Copper Nitrate, cryst., C.P. $Cu(NO_3)_2+3H_2O$	lb.	c.b.	$1.00
	5 lb.	c.b., Per lb.	.90
Copper Nitrate, techn	lb.	c.b.	$ .85
Copper Oxide, black, fine, C.P. CuO	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.50
Copper Oxide, black, coarse, C.P.	¼ lb.	c.b.	$ .75
	lb.	c.b.	1.90
Copper Oxide, black, powd., coml.	lb.	pkg.	$ .70
	5 lb.	pkg., Per lb.	.65
Copper Oxide, red, C.P. Cu_2O	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.30
Copper Oxide, wire, C.P. CuO	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Copper Phosphate, C.P. $CuHPO_4$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Copper Potass. Chloride, C.P., $CuCl_2.2KCl+2H_2O$	¼ lb.	c.b.	$ .50
	lb.	c.b.	1.10
Copper Silicate, C.P., $CuSiO_3$	lb.	c.b.	$ .75
Copper Suboxide, see **Copper Oxide**, red			

CHEMICALS AND REAGENTS

Name and Formula			Price
Copper Sulfate, cryst., C.P. $CuSO_4+5H_2O$	lb.	c.b.	$ .70
	5 lb.	c.b., Per lb.	.60
Copper Sulfate, special large crystals, low iron, C.P.	¼ lb.	c.b.	$ .50
	lb.	c.b.	1.15
Copper Sulfate, anhydr., C.P. $CuSO_4$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35
Copper Sulfate, cryst., techn.	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.15
Copper Sulfide, pptd., C.P. CuS	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.40
Copperas, see Iron (ous) sulfate			
Corallin, see Stains			
Corn Sugar, see Dextrose			
Corrosive Sublimate, see Mercury (ic) Chloride			
Cotton, all kinds, see page 263			
Cream Tartar, see Potass. Bitartrate			
Creatinine, C.P.	1 gm.		$ .60
Creolin, Pearson's	lb.	c.b.	$1.30
Creosote from Coal Tar	lb.	c.b.	$ .55
	½ gal.	can	1.50
Creosote, U.S.P., from wood tar	½ lb.	c.b.	$ .80
Cresol, U.S.P., C_7H_7OH	lb.	c.b.	$ .80
Cresol Blue, see **Stains**			
Cresol Red, see **Stains**			
Crocus martis, see Iron Oxide, red			
Crystal Violet, see Stains			
Culture Media, see separate list, pages 597-600			
Cupferron	oz.	c.b.	$1.90
Cyanamide	lb.	p.c.	$ .40
	5 lb.	pkg., Per lb.	.30

D

Name and Formula			Price
Delafield Solution, see Haematoxyline Solution under Stains			
Dextrin, white, techn.	lb.	p.c.	$ .45
	5 lb.	pkg., Per lb.	.35
Dextrose (Glucose), corn sugar techn.	lb.	p.c.	$ .20
	5 lb.	pkg., Per lb.	.15
Dextrose Bacto, see Culture Media Reagents			
Dextrose, grape sugar, anhyd., C.P.	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.65
Diacetyldioxim, see Dimethylglyoxime			
Diamond Ink, see page 290			
Diastase of Malt, medic.	oz.	c.b.	$ .55
Diatomaceous Earth, see Earth, Infusorial			
Dimethylamidoazobenzene Para, $C_6H_5.N_2C_6H_4N(CH_3)_2$	25 gms.		$1.50
Dimethylamidobenzaldehyde Para $(CH_3)_2N.C_6H_4.CHO$	10 gms.	c.b.	$1.90
Dimethylamidoazobenzol, Solution, see Toepfer Solution			
Dimethylaniline (Dimethylamido Benzol) $C_6H_5N(CH_3)_2$	¼ lb.	c.b.	$ .75
	lb.	c.b.	1.85
Dimethylbenzene, see Xylene			
Dimethylglyoxime (Diacetyldioxime), nickel reagent $(CH_3)_2C_2(NOH)_2$	25 gm.	c.b.	$2.00
Dimethylsulfate, liquid $(CH_3)_2SO_4$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Dinitrobenzene $C_6H_4(NO_2)_2$	100 gm.	c.b.	$1.20
	500 gm.	c.b.	4.95
Dioxyanthraquinone, see Alizarine			
Dioxygen, see Hydrogen Peroxide			
Dioxytriphenylphtalide, see Phenolphtalein under Stains			
Diphenylamine $(C_6H_5)_2NH$	oz.	c.b.	$ .45
	lb.	c.b.	2.00
Diphenylcarbazide (M. Pt. 172–173° C.)	10 gm.	g.s.b.	$2.70
	25 gm.	g.s.b.	5.40
Distilled Water, see Water, distilled			
Dulcit $C_6H_8(OH)_6$	5 gm.	c.b.	$3.50
	10 gm.	c.b.	6.25
	25 gm.	c.b.	13.75
Dutch Metal leaf, see Gold Leaf Composition			
Dyes, Aniline, see Stains			

E

Name and Formula			Price
Earth, Fullers	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.10
Earth, Infusorial	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.15
Emery, fine, medium and coarse, powd.	lb.	pkg.	$ .40
	5 lb.	pkg., Per lb.	.35
Eosine, see Stains			
Epsom Salt, see Magnes. Sulfate			
Erythrosine, see Stains			
Esbach's Albumen Solution	100 ml.	c.b.	$ .50
	500 ml.	c.b.	2.25

CHEMICALS AND REAGENTS

Name and Formula			Price
Eschka's Mixture, see Mag. Oxide and Sod. Carbonate			
Ether (Sulfuric) Ethylic Ether, conc., U.S.P. $(C_2H_5)_2O$	lb.	tin	$ .70
	5 lb.	tin, Per lb.	.55
Ether (Sulfuric) Ethylic, washed	lb.	tin	$ .95
Ether (Sulfuric) Ethylic, Anhydrous, dist. over Na	lb.	tin	$1.05
Ether (Sulfuric) Ethylic, Squibb, pure	lb.	tin	$1.35
Ether Acetic (ethyl acetate), U.S.P.	lb.	c.b.	$ .70
Ether Acetic, absol. C.P. $CH_3COOC_2H_5$	lb.	c.b.	$ .95
Ether Amylacetic, see Amyl Acetate			
Ether Petrolic B. Pt. 50 to 60° C	lb.	c.b.	$ .75
	5 lb.	c.b., Per lb.	.60
Ether Petrolic, Special, B. Pt. 25 to 40° C	lb.	c.b.	$1.05
Ether Pyroacetic, see Acetone			
Ethyl Acetate, see Ether Acetic			
Ethyl Bromide C_2H_5Br	¼ lb.	c.b.	$ .75
	lb.	c.b.	1.80
Ethyl Chloride B. Pt. 12.5–13°	100 gm.	sealed vial,	$1.65
Ethyl Formate, conc. $HCOO.C_2H_5$	lb.	c.b.	$2.00
Ethyl Hydroxide, see Alcohol Ethylic			
Ethyl Nitrate (B. Pt. 84.5–85.5° C.)	25 gm.	sealed vial,	$2.35
	100 gm.	sealed vial,	6.75
Ethyl Oxide, see Ether Sulfuric			
Ethylene Bromide (Dibromethane), $CH_2Br.CH_2Br$	50 gm.	c.b.	$ .95

F

Fehling Solution "A," copper	pt.	c.b.	$1.35
	qt.	c.b.	2.40
Fehling Solution "B," alkaline	pt.	c.b.	$1.35
	qt.	c.b.	2.40
Feldspar	lb.	pkg.	$ .30
Ferric and Ferrous Salts, see Iron Salts			

FIXANAL MATERIALS

Analytical chemicals, correctly weighed and standardized, in sealed glass capsules, which enable the preparation of normal solutions in five minutes. Capsule makes 1000 ml. solution.

Name and Formula		Price
Glass Parts, special funnel and two parts for breaking the capsule		$1.00
Acid, Hydrochloric, N/10	capsule,	$ .75
Acid, Sulphuric, N/10	capsule,	$ .75
Potass. Hydroxide, N/10	capsule,	$ .75
Silver Nitrate, N/10	capsule,	$ .75
Sodium, Carbonate, N/10	capsule,	$ .75
Sodium, Hydroxide, N/10	capsule,	$ .75

Fluorescein (Diresocinolphthalein), $C_{20}H_{12}O_5+H_2O$	25 grm.	c.b.	$1.60
Fluorspar, see Calcium Fluoride native			
Formaldehyde solution, U.S.P., 40% (Oxymethylene) H.CO.H	lb.	c.b.	$ .45
	gal.	can	1.95
	100 lb.	carboy, Per lb.	.18
		Carboy $5.00 extra, returnable	
Formol, see Formaldehyde			
Fossil Flour, see Infusorial Earth			
Fructose, see Levulose			
Fruit Sugar, see Levulose			
Fuchsine, see Stains			
Fullers Earth, see Earth, Fullers			
Furfurol (Pyromucic aldehyde), C.P., $C_5H_4O_2$	oz.	c.b.	$ .50
Fusel Oil, see Alcohol Amylic			

G

Gabbet's Stain, see Stains			
Galactose, C.P. (Lactoglucose), $C_6H_{12}O_6$	oz.	c.b.	$1.25
Galena, see Lead Sulfide, native			
Gases, see page 369			
Giemsa Stain, see Stains			
Gelatine, Bacto, see Culture Media Reagents			
Gelatine, Gold Label	500 gm.	pkg.	$2.20
Gelatine, Bacto, granular, see Culture Media			
Gentian Violet, see Stains			
Glass Wool, see page 401			
Glucose, see Dextrose			
Glue, see page 402			
Glycerin, C.P. $C_3H_5(OH)_3$	lb.	c.b.	$ .65
	gal.	can	3.75

CHEMICALS AND REAGENTS

Name and Formula			Price
Glycophenol, see Saccharine			
Gold Leaf, pure			Per book, **$1.20**
Gold Leaf, composition, "Dutch Metal"			Per book, **$ .30**
Gold Chloride, yellow $AuCl_3+HCl+4H_2O$	**1 gm.**	vial	**$1.00**
Gram's Iodine Solution, see Stains			
Grape Sugar, see Dextrose			
Graphite, fine flakes	**lb.**	pkg.	**$ .95**
Gum Arabic, white	**lb.**	pkg.	**$ .65**
Gum Damar	**lb.**	pkg.	**$ .90**
Gypsum, see Calcium Sulfate			

H

Name and Formula			Price
Haematoxylin, see Stains			
Haine's Glucose Solution	**100 ml.**	c.b.	**$ .50**
Hastings Stain, see **Stains**			
Hayem's Solution	**4 oz.**	c.b.	**$ .65**
	8 oz.	c.b.	**1.00**
Hemoglobin powder	**oz.**	c.b.	**$ .40**
Hide Powder for standardizing	**oz.**	p.c.	**$ .50**
	lb.	p.c.	**4.95**
Hydrazine Sulphate	**50 gm.**	c.b.	**$3.10**
	100 gm.	c.b.	**4.75**
Hydrogen Peroxide, 3%, 10 Vol., U.S.P., H_2O_2+Aq	**lb.**	c.b.	**$ .40**
	5 lb.	c.b., per lb.	**.30**
Hydrogen Peroxide, 3% Marchand	**lb.**	c.b.	**$ .85**
Hydrogen Peroxide, "**Dioxogen,**" Oakland, 12 Vol	**20 oz.**	c.b.	**$1.10**
Hydrogen Peroxide, "**Superoxol**"	**lb.**	g.s.b.	**$4.95**
Hydroquinone (Paradioxybenzene), $C_6H_6O_2$	**¼ lb.**	c.b.	**$ .90**
	lb.	c.b.	**2.70**
Hydroxybenzene, see Acid, Carbolic			
Hydroxylamine Hydrochloride $NH_2.OH.HCl$	**oz.**	c.b.	**$1.30**

I

Name and Formula			Price
Iceland Spar for standardizing	**oz.**	c.b.	**$ .60**
	¼ lb.	c.b.	**1.20**
Indigo-Carmine, see Stains			
Infusorial Earth, see Earth, Infusorial			
Inulin	**25 gm.**	c.b.	**$4.80**
Iodine, resublimed I_2	**¼ lb.**	g.s.b.	**$2.40**
	lb.	g.s.b.	**7.40**
Iodine Solution, Gram's, see Stains			
Iodine tincture	**1 oz.**	c.b.	**$ .50**
	4 oz.	c.b.	**.75**
Iodine Pentoxide, see Acid, Iodic			
Iron card teeth	**lb.**	pkg.	**$ .20**
	5 lb.	pkg., per lb.	**.17**
Iron Filings	**lb.**	pkg.	**$ .15**
	5 lb.	pkg., per lb.	**.12**
Iron Powder, reduced by Alcohol, 40 mesh	**lb.**	c.b.	**$ .55**
	5 lb.	c.b., per lb.	**.40**
Iron Powder, reduced by hydrogen	**¼ lb.**	c.b.	**$ .70**
	lb.	c.b.	**1.75**
Iron Wire for standardizing, on spools, see No. 15-550			
Iron (ferric) **Ammon. Citrate** brown scales	**¼ lb.**	c.b.	**$ .65**
	lb.	c.b.	**1.55**
Iron (ferric) **Ammon. Citrate** green scales	**¼ lb.**	p.c.	**$ .50**
	lb.	p.c.	**1.45**
Iron (ferric) **Ammon. Oxalate,** C.P. $(NH_4)_3Fe(C_2O_4)_3+3H_2O$	**¼ lb.**	c.b.	**$ .65**
	lb.	c.b.	**1.55**
Iron (ferric) **Ammon. Sulphate,** (ferric alum) C.P. $Fe_2(NH_4)_2(SO_4)_4+24H_2O$	**¼ lb.**	c.b.	**$ .40**
	lb.	c.b.	**.70**
Iron (ferrous) **Ammon. Sulphate,** C.P. $Fe(NH_4)_2(SO_4)_2+6H_2O$	**lb.**	c.b.	**$ .70**
	5 lb.	c.b., per lb.	**.55**
Iron (ferrous) **Ammon. Sulphate,** special, 100%, Cu, P, Zn, Cl, Mn free	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**1.00**
Iron (ous) **Carbonate,** powd., C.P., $FeCO_3$	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**.95**
Iron (ferric) **Chloride,** cryst., C.P.	**lb.**	c.b.	**$ .60**
	5 lb.	c.b., per lb.	**.50**
Iron (ferric) **Chloride,** lump, C.P., special Phos. free $FeCl_3+6H_2O$	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**1.15**
Iron (ferric) **Chloride,** anhyd., sublimed, $FeCl_3$	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**1.15**
Iron (ferrous) **Chloride,** dry, gran., C.P., $FeCl_2$	**¼ lb.**	c.b.	**$ .50**
	lb.	c.b.	**.95**
Iron (ferric) **Hydroxide,** moist, C.P., $Fe(OH)_3$	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**.85**
Iron (ferric) **Nitrate,** cryst., C.P., $Fe(NO_3)_3+18H_2O$	**¼ lb.**	c.b.	**$ .45**
	lb.	c.b.	**1.05**
Iron (ferric) **Oxalate,** cryst., C.P., $Fe_2(C_2O_4)_3$	**¼ lb.**	c.b.	**$ .95**
	lb.	c.b.	**2.45**
Iron (ferrous) **Oxalate,** C.P. $FeC_2O_4+2H_2O$	**¼ lb.**	c.b.	**$ .75**
	lb.	c.b.	**1.85**

CHEMICALS AND REAGENTS

Name and Formula			Price
Iron (ferric) **Oxide,** powd., C.P., Fe_2O_3	**lb.**	c.b.	$ .80
	5 lb.	c.b., per lb.	.75
Iron Oxide, Jewelers Rouge, see Rouge			
Iron Persulfate, see Iron (ic) Sulfate			
Iron (ferric) **Sulphate,** c.p. $Fe_2(SO_4)_3$	**lb.**	c.b.	$ .80
	5 lb.	c.b., per lb.	.65
Iron (ferric) **Sulphate,** U.S.P.	**lb.**	c.b.	$ .50
Iron (ferrous) **Sulphate,** cryst., C.P., Phos. free $FeSO_4.7H_2O$	**lb.**	c.b.	$ .80
	5 lb.	c.b., per lb.	.65
Iron (ferrous) **Sulphate,** c.p., special, fine cryst., Mn. free	**lb.**	c.b.	$1.00
	5 lb.	c.b., per lb.	.85
Iron (ferrous) **Sulphate,** powd. by alcohol, C.P	**lb.**	c.b.	$ .60
	5 lb.	c.b., per lb.	.50
Iron (ferrous) **Sulphate,** gran., Techn	**lb.**	pkg.	$ .15
	5 lb.	pkg., per lb.	.08
Iron (ferrous) **Sulphate,** cryst., Techn	**lb.**	p.c.	$ .35
	5 lb.	p.c., per lb.	.30
Iron Sulphide (ferrous), small lumps, FeS	**lb.**	p.c.	$ .20
	10 lb.	pkg., per lb.	.15
Iron Sulphide sticks	**lb.**	p.c.	$ .20
	10 lb.	pkg., per lb.	.17
Iron Sulphide, native (iron pyrites)	**lb.**	p.c.	$ .40
	5 lb.	p.c., per lb.	.35
Isatin $C_8H_5NO_2$	**1 gm.**	vial	$1.20
Isinglass, see Gelatine			
Isinglass, Japanese, see Agar Agar			
Isobutylcarbinol, see Alcohol amylic			

J

Name and Formula			Price
Jack Bean Meal	**lb.**	c.b.	$2.70
Japan Wax, see Wax			
Jenner's Stains, see Stains			
Juncket Tablets		**box**	$ .25
		10 boxes,	1.80

K

Name and Formula			Price
Kaolin	**lb.**	pkg.	$ .20
	5 lb.	pkg., per lb.	.10
Kaolin, Acid washed	**lb.**	c.b.	$1.00
Kaolin, washed and ignited	**lb.**	c.b.	$1.50
Kermes Mineral, see Antimony Sulfide, red			
Kerosene		**gal.** can	$ .70
	5 gal.	can, per gal.	.47
Kieselguhr, see Earth, Infusorial			
Kryolith	**lb.**	p.c.	$ .50

L

Name and Formula			Price
Lacmoid, see Stains			
Lactose (Milk Sugar) powd	**lb.**	tin	$ .85
Lactose, Bacto, see Culture Media Reagents			
Lampblack	**lb.**	pkg.	$ .60
	5 lb.	pkg., per lb.	.55
Lanum, anhydr. (Wool Fat)	**lb.**	tin	$ .70
Lead, Test Lead (Ag free) gran	**lb.**	p.c.	$ .45
	5 lb.	p.c., per lb.	.35
Lead Metal, com'l sticks	**lb.**	pkg.	$ .40
Lead, com'l sheet, 1/16-inch. About 4 lbs. to sq. ft.		Per lb.	$ .30
Lead, Shot, No. 1	**lb.**	p.c.	$ .40
	5 lb.	p.c., per lb.	.35
Lead Foil	**lb.**	pkg.	$ .55
Lead Acetate, C.P., powd. (sugar of lead) (subacetate) $Pb(C_2H_3O_2)_2+3H_2O$	**lb.**	c.b.	$ .85
	5 lb.	c.b., per lb.	.70
Lead Acetate, Basic, cryst., C.P., $Pb(C_2H_3O_2)OH$	**lb.**	c.b.	$ .60
	5 lb.	c.b., per lb.	.45
Lead Carbonate, C.P. $2PbCO_3.Pb(OH)_2$	**lb.**	c.b.	$ .85
	5 lb.	c.b., per lb.	.70
Lead Carbonate (White Lead)	**lb.**	p.c.	$ .45
	5 lb.	p.c., per lb.	.35
Lead Chloride, C.P. $PbCl_2$	**¼ lb.**	c.b.	$ .50
	lb.	c.b.	1.10
Lead Chromate, powd., C.P. $PbCrO_4$	**¼ lb.**	c.b.	$ .55
	lb.	c.b.	1.30
Lead Chromate, fused, powd., C.P., $PbCrO_4$	**¼ lb.**	c.b.	$ .70
	lb.	c.b.	1.70
Lead Dioxide, see Lead Oxide, Brown			
Lead Nitrate, C.P. $Pb(NO_3)_2$	**lb.**	c.b.	$ .90
	5 lb.	c.b., per lb.	.75
Lead Nitrate, Techn	**lb.**	tin	$ .45
	5 lb.	tin, per lb.	.40
Lead Oxide (di) **Brown,** C.P. (Peroxide), PbO_2	**lb.**	c.b.	$1.15
	5 lb.	c.b., per lb.	1.00
Lead Oxide (di) **Brown,** C.P., Special Sul. free	**lb.**	c.b.	$1.70
Lead Oxide (Mono) **Yellow,** C.P., PbO	**lb.**	c.b.	$ .75
	5 lb.	c.b., per lb.	.60
Lead Oxide (Mono) **Yellow** (Litharge)	**lb.**	p.c.	$ .40
	5 lb.	p.c., per lb.	.35

Prices include containers except where otherwise noted. All prices are subject to market fluctuations.

CHEMICALS AND REAGENTS

Name and Formula			Price
Lead Oxide Yellow (Litharge), Assayers (silver, .005 oz. per ton)	lb.	p.c.	$ .45
	10 lb.	p.c., per lb.	.40
Lead Oxide Red, C.P. Pb_3O_4	lb.	c.b.	$ .75
	5 lb.	c.b., per lb.	.60
Lead Oxide Red, special carbonate free	500 gm.	c.b.	$ .95
Lead Oxide Red, com'l	lb.	p.c.	$ .40
	5 lb.	p.c., per lb.	.35
Lead Peroxide, see Lead Oxide (di) Brown			
Lead Subacetate, see Lead acetate Basic			
Lead Sulphate, C.P. $PbSO_4$	¼ lb.	c.b.	$ .50
	lb.	c.b.	1.15
Lead Sulphide, C.P. PbS	¼ lb.	c.b.	$ .75
	lb.	c.b.	1.85
Lead Sulphide, native (Galena), lumps	lb.	p.c.	$ .50
	5 lb.	p.c., per lb.	.40
Levulose Syrup $C_6H_{12}O_6+Aq$	oz.	c.b.	$1.00
	8 oz.	c.b.	5.00
Levulose (Fructose) $C_6H_{12}O_6$	10 gm.		$2.40
	25 gm.		3.85
Ligroin, B.P. 100–120°	lb.	c.b.	$ .95
Lime, see Calcium Oxide			
Lime, Chlorinated, see Calc. Hypochlorite			
Litharge, see Lead Oxide-Mono			
Lithium Carbonate, C.P. Li_2CO_3	oz.	c.b.	$ .40
	½ lb.	c.b.	2.05
Lithium Chloride, C.P. LiCl	oz.	c.b.	$ .50
	½ lb.	c.b.	2.15
Lithium Nitrate, C.P. $LiNO_3$	oz.	c.b.	$ .50
	½ lb.	c.b.	2.15
Litmus, cubes	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.15
Litmus, powd	¼ lb.	c.b.	$1.00
	lb.	c.b.	2.30
Litmus Milk, see Culture Media			
Litmus Paper, see Test Papers under Apparatus Section, page 543			
Loeffler's Blood Serum	¼ lb.	c.b.	$3.25
	lb.	c.b.	12.00
Logwood Chips	lb.	pkg.	$ .50
Logwood Extract	¼ lb.	p.c.	$ .35
	lb.	pkg.	1.00
Lycopodium	oz.	c.b.	$ .50
Lysol	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.30

M

Name and Formula			Price
Magnesia, see Magnesium Oxide			
Magnesite, lumps	lb.	p.c.	$ .40
Magnesium Metal, powd. Mg	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.65
Magnesium Metal, ribbon	oz.	rolls	$ .70
Magnesium Acetate, C.P. $Mg(C_2H_3O_2)_2+4H_2O$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.65
Magnesium Ammon. Chloride, C.P. $MgCl._2(NH_4)Cl+6H_2O$	¼ lb		$ .40
	lb.	c.b.	.70
Magnesium Borate, C.P. $Mg(BO_2)_2.8H_2O$	¼ lb.	c.b.	$ .65
	lb.	c.b.	1.55
Magnesium Bromide, cryst., C.P., $MgBr_2+6H_2O$	oz.	c.b.	$ .50
Magnesium, Calcined, see Magnesium Oxide			
Magnesium Carbonate, powd., C.P., $MgCO_3$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.30
Magnesium Carbonate, com'l	lb.	p.c.	$ .50
	5 lb.	p.c., per lb.	.40
Magnesium Chloride, cryst., C.P., $MgCl_2+6H_2O$	lb.	c.b.	$ .70
	5 lb.	c.b., per lb.	.55
Magnesium Chloride, fused lumps, C.P	lb.	c.b.	$1.00
Magnesium Citrate, C.P. $Mg_3(C_6H_5O_7)_2+14H_2O$	oz.	c.b.	$ .45
	lb.	c.b.	3.10
Magnesium Nitrate, cryst., C.P., $Mg(NO_3)_2+Aq$	lb.	c.b.	$ .80
	5 lb.	c.b., per lb.	.65
Magnesium Oxide, C.P. MgO	lb.	c.b.	$2.60
Magnesium Oxide, light, U.S.P.	lb.	tin	$1.25
Magnesium Oxide, heavy, U.S.P.	lb.	tin	$1.25
Magnesium Oxide and **Sod. Carbonate,** C.P. (Eschka's Mixture)	lb.	c.b.	$2.60
	5 lb.	c.b., per lb.	2.50
Magnesium Peroxide, techn.	oz.	tin	$ .50
	lb.	tin	3.70
Magnesium Phosphate, tertiary, powd., C.P. $Mg_3(PO_4)_2-4H_2O$	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.25
Magnesium Sulphate, cryst., C.P., $MgSO_4+7H_2O$	lb.	c.b.	$ .50
	5 lb.	c.b., per lb.	.40

Prices include containers except where otherwise noted. All prices are subject to market fluctuations.

CHEMICALS AND REAGENTS

Name and Formula			Price
Magnesium Sulphate, anhydr., C.P.	lb.	c.b.	$ .75
Magnesium Sulphate, cryst., pure (Epsom salt)	lb.	p.c.	$ .20
	5 lb.	p.c. per lb.	.10
Malachite Green, see Stains			
Malt Diastase, see Diastase of Malt			
Maltose (Malt Sugar), C.P. $C_{12}H_{22}O_{11}+H_2O$	oz.	c.b.	$1.50
	¼ lb.	c.b.	5.50
Maltose, Bacto	100 gm.	c.b.	$4.50
Manganese Acetate, C.P. $Mn(C_2H_3O_2)_2+H_2O$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.75
Manganese Borate, C.P. MnB_4O_7	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.35
Manganese Carbonate, C.P. $MnCO_3$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.45
Manganese Chloride, C.P. $MnCl_2+4H_2O$	¼ lb.	c.b.	$ .45
	lb.	c.b.	1.00
Manganese Dioxide, powd., C.P.	lb.	c.b.	$ .90
	5 lb.	c.b., per lb.	.75
Manganese Dioxide (Pyrolusite), native, powd.	lb.	pkg.	$ .15
	5 lb.	pkg., per lb.	.13
Manganese Nitrate, C.P., cryst., $Mn(NO_3)_2+Aq$	¼ lb.	c.b.	$ .75
	lb.	c.b.	1.50
Manganese Oxide, hydrated, C.P., $Mn_2O_2(OH)_2$	¼ lb.	c.b.	$ .45
	lb.	c.b.	1.00
Manganese Peroxide, see Manganese Dioxide			
Manganese Sulfate, C.P., cryst., $MnSO_4+4H_2O$	lb.	c.b.	$ .50
	5 lb.	c.b., per lb.	.40
Mannit $C_6H_8(OH)_6$	oz.	c.b.	$ .50
	lb.	c.b.	5.00
Mannit Bact.	25 gm.		$1.10
	100 gm.		3.00
Mannose Bact.	10 gm.		$4.80
Marble Chips, see Calcium Carbonate			
Melampyrit, see Dulcit			
Melezitose Bact.	10 gm.		$3.00
Menthol, cryst. $C_{10}H_{19}.OH$	oz.	c.b.	$1.70
	¼ lb.	c.b.	5.50
Mercury Metal Hg	lb.	c.b.	$2.00
	10 lb.	jug, per lb.	1.70
Special price in flasks of 75 lbs.			
Mercury (ic) **Acetate,** C.P. $Hg(C_2H_3O_2)_2$	oz.	c.b.	$ .50
	½ lb.	c.b.	2.05

Name and Formula			Price
Mercury (ic) **Chloride** (Bi), C.P., powd., $HgCl_2$	½ lb.	c.b.	$1.65
	lb.	c.b.	2.75
Mercury (ous) **Chloride,** C.P., powd., Hg_2Cl_2	½ lb.	c.b.	$1.50
	lb.	c.b.	2.30
Mercury (ic) **Cyanide,** C.P., powd., $Hg(CN)_2$	oz.	c.b.	$ .55
	¼ lb.	c.b.	1.25
Mercury (ic) **Iodide Red,** C.P. HgI_2	¼ lb.	c.b.	$1.75
	lb.	c.b.	5.45
Mercury (ic) **Iodide,** U.S.P., red, powd	oz.	c.b.	$ .75
Mercury (ic) **Nitrate,** C.P., cryst., $Hg(NO_3)_2$	¼ lb.	g.s.b.	$ .85
	lb.	g.s.b.	2.15
Mercury (ous) **Nitrate,** C.P., cryst., $Hg(NO_3)+2H_2O$	¼ lb.	g.s.b.	$ .90
	lb.	g.s.b.	2.60
Mercury (ous) **Oxide Black,** C.P., powd., Hg_2O	¼ lb.	c.b.	$1.30
	lb.	c.b.	4.05
Mercury (ic) **Oxide Red,** U.S.P., powder, HgO	¼ lb.	c.b.	$1.00
	lb.	c.b.	2.95
Mercury (ic) **Oxide Yellow,** C.P., powd., HgO	¼ lb.	c.b.	$1.20
	lb.	c.b.	3.60
Mercury (ic) **Sulfate,** C.P., cryst., $HgSO_4$	¼ lb.	g.s.b.	$ .80
	lb.	g.s.b.	1.95
Mercury (ous) **Sulfate,** C.P., powd., Hg_2SO_4	½ lb.	c.b.	$1.75
	lb.	c.b.	2.95
Mercury (ic) **Sulfide,** C.P., powd., HgS	oz.	c.b.	$ .55
	lb.	c.b.	3.85
Mercury (ic) **Sulfide,** ore (Cinnabar)	lb.	p.c.	$ .40
	5 lb.	pkg., Per lb.	.30
Metadioxybenzene, see Resorcin			
Metals Fusible, see Alloys			
Methanamid, see Formamide			
Methenyl Tribromide, see Bromoform			
Methyl Acetate, C.P., liq. $CH_3.COOCH_3$	¼ lb.	c.b.	$ .45
	lb.	c.b.	1.05
Methyl Alcohol, see Alcohol Methylic			
Methyl Blue, see Stains			
Methyl Hydroxide, see Alcohol Methylic			
Methyl Iodide, C.P., liq. CH_3I	oz.	c.b.	$1.30
	lb.	c.b.	11.40
Methyl Orange, see Stains			
Methyl Red, see Stains			

CHEMICALS AND REAGENTS

Name and Formula			Price
Methyl Salicylate (Synthetic Wintergreen Oil), $C_8H_8O_3$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.30
Methyl Violet, see Stains			
Methylacetyl, see Acetone			
Methylbenzene, see Toluene			
Methylene Blue, see Stains			
Methylene Blue, Tablets for Reductase Test	Per 100 tblts.,		$2.00
Methylene Green, see Stains			
Methylpara-amidometacresol Sulfate or Hydrochloride, see Metol			
Methylpropylphenol Normal, see Thymol			
Methylpropylphenyl Hexahydride, see Menthol			
Methylprotocatechuic Aldehyde, see Vanillin			
Methyltheobromine, see Caffeine			
Metol, see Photol			
Michler's Ketone (Pract.)	25 gm.	tin	$ .90
	250 gm.	tin	4.00
Microcosmic Salt, see Sodium Ammon. Phosphate			
Microscopical Stains, see Stains			
Milk Sugar, see Lactose			
Millon's Albumen Solution	100 ml.	c.b.	$ .85
Mineral Carbon, see Graphite			
Mineral Green, see Copper Carbonate			
Mineral Pitch, see Asphaltum			
Mineral Wax, see Ceresin			
Mineral Wool	5 lb.	bag	$ .30
	25 lb.	bag	1.10
Minium, see Lead Oxide, red			
Mohr's Salt, see Iron (ous) Ammon. sulfate			
Molybdenum Trioxide, see Acid Molybdic			
Monoamidodiphenylamine Hydrochloride, see Phenylhydrazine, HCl			
Monobromethan, see Ethyl Bromide			

N

Name and Formula			Price
Naphtha, Coal Tar, see Benzol			
Naphtha, Petroleum, see Benzin			
Naphtha, Wood, see Alcohol Methylic			
Naphthalene, Resublimed $C_{10}H_8$	lb.	p.c.	$ .50
	5 lb.	p.c., Per lb.	.40
Naphthol Alpha $C_{10}H_7.OH$	oz.	c.b.	$ .35
	¼ lb.	c.b.	.85
Naphthol Beta, U.S.P. Resublimed, $C_{10}H_7.OH$	oz.	p.c.	$ .30
	¼ lb.	p.c.	.55
Naphthol Beta Nitroso, C.P., cryst., $C_{10}H_6(NO)OH$	oz.	c.b.	$ .85
	lb.	c.b.	8.60
Naphthol Green, see Stains			
Naphthol Yellow, see Stains			
Naphthylamine Alpha, cryst. $C_{10}H_7.NH_2$	oz.	c.b.	$ .35
	lb.	c.b.	1.50
Naphthylamine Alpha Hydrochloride, C.P., cryst. $C_{10}H_7NH_2.HCl$	oz.	c.b.	$ .60
	lb.	c.b.	4.05
Nessler's Reagent (Ammonia and Aldehyde)	100 ml.	c.b.	$ .75
	500 ml.	c.b.	2.00
Neusser's Stain, see Stains			
Neutral Red, see Stains			
Nickel Metal, shot Ni	lb.	p.c.	$ .70
	10 lb.	p.c., Per lb.	.65
Nickel Metal, pure sheet, see page 472			
Nickel Metal, wire, see apparatus list, page 567			
Nickel Ammon. Sulfate, C.P., cryst. $NiSO_4.(NH_4)_2SO_4+6H_2O$	¼ lb.	c.b.	$ .45
	lb.	c.b.	.85
Nickel Ammon. Sulfate, pure, com'l	lb.	p.c.	$ .45
	5 lb.	p.c., Per lb.	.41
Nickel Chloride, C.P., cryst. $NiCl_2$	¼ lb.	c.b.	$ .75
	lb.	c.b.	1.80
Nickel Nitrate, C.P., cryst. $Ni(NO_3)_2.6H_2O$	½ lb.	c.b.	$1.00
	lb.	c.b.	1.45
Nickel (ic) **Oxide, black,** C.P., powd., Ni_2O_3	½ lb.	c.b.	$1.30
	lb.	c.b.	2.00
Nickel (ous) **Oxide, green,** C.P., powd., NiO	½ lb.	c.b.	$1.30
	lb.	c.b.	2.00
Nickel Sulfate, C.P., cryst. $NiSO_4.7H_2O$	lb.	c.b.	$ .95
	5 lb.	c.b., Per lb.	.90
Nickel Sulfate, C.P., com'l	lb.	p.c.	$ .45
	5 lb.	p.c., Per lb.	.35
Nigrosine, see Stains			
Nitre, see Potass. Nitrate			
Nitrobenzol rectif. (Oil Mirbane), $C_6H_5NO_2$	lb.	c.b.	$ .45
	gal.	can	2.50
Nutgall, U.S.P., powder	oz.	p.c.	$ .20
	½ lb.	p.c.	.55
Nutrose	oz.	c.b.	$1.65

O

Name and Formula			Price
Obermayer's Solution	100 ml.	c.b.	$ .65
	500 ml.	c.b.	3.00
Oil, Almond Bitter, artific., see Benzaldehyde			

CHEMICALS AND REAGENTS

Name and Formula			Price
Oil, Aniline, see Aniline, pure			
Oil, Bergamot, rectif.	oz.	c.b.	$1.30
	½ lb.	c.b.	5.75
Oil, Castor	pt.	c.b.	$ .55
	gal.	can	3.15
Oil, Cedar Wood, clearing	lb.	c.b.	$1.95
	5 lb.	c.b., Per lb.,	1.80
Oil, Cedar Wood, for immersion	oz.	c.b.	$ .55
	lb.	c.b.	4.95
Oil, China Wood	pt.	c.b.	$ .75
	gal.	can	3.60
Oil, Cloves, rectif.	¼ lb.	c.b.	$1.50
	lb.	c.b.	4.80
Oil, Cotton Seed	pt.	c.b.	$ .60
	gal.	can	3.50
Oil, Fusel, see Alcohol Amylic			
Oil, Kerosene, see Kerosene			
Oil, Linseed, raw	pt.	c.b.	$ .55
	gal.	can	2.50
Oil, Linseed, boiled	pt.	c.b.	$ .60
	gal.	can	3.25
Oil, Mirbane, see Nitrobenzol			
Oil, Olive	pt.	can	$ .95
Oil, Paraffin, White	qt.	c.b.	$ .95
	gal.	can	2.90
Oil, Peppermint, U.S.P., Redist.	Prices on request		
Oil, Petroleum, crude	qt.	can	$ .60
	gal.	can	1.45
Oil, Rosin	pt.	c.b.	$ .70
	qt.	c.b.	1.20
Oil, Turkey Red	lb.	c.b.	$ .90
	5 lb.	c.b., Per lb.	.85
Oil, Turpentine	pt.	c.b.	$ .55
	gal.	can	2.55
Oil, Turpentine, rectif., U.S.P.	lb.	c.b.	$ .90
	5 lb.	c.b., Per lb.	.85
Oil, Wintergreen, Synthetic, see Methyl Salicylate			
Orange A, see Stains			
Ox-Gall, Bacto, dehydr., powd.	¼ lb.	c.b.	$ .85
	lb.	c.b.	3.10
Oxone Cubes (Sod. peroxide fused for generating O)	2½ lb.	tin	$2.30
Oxone Cartridges (Sod. peroxide fused for generating O)	¼ lb.	tin	$ .80
Oxyethylacetanilide, see Acetphenetidin			
Oxymethylene, see Formaldehyde			
Ozokerite, see Ceresin Black			
P			
Palladium Chloride, dry $PdCl_2$	gm.	vial	$4.10
Pancreatin, pure, U.S.P.	oz.	c.b.	$ .50
	¼ lb.	c.b.	1.15

Name and Formula			Price
Papers—Test, see Test Papers, page 543			
Para-Aminotoluene, see Toluidine Para-			
Paradiaminodiphenyl, see Benzidine			
Paradioxybenzene, see Hydroquinone			
Paraffin Solid, soft, M. Pt. 46° to 48° C.	lb.	pkg.	$ .55
	5 lb.	pkg.	.50
Paraffin Solid, soft, M. Pt. 48° to 50° C.	lb.	pkg.	$ .55
	5 lb.	pkg.	.50
Paraffin Solid, medium, M. Pt. 52° to 54° C.	lb.	pkg.	$ .55
	5 lb.	pkg.	.50
Paraffin Solid, Parawax, M. Pt. 54° to 56° C.	lb.	pkg.	$ .25
	5 lb.	pkg.	.21
Paraffin Solid, hard, M. Pt. 56° to 58° C.	lb.	pkg.	$ .55
	5 lb.	pkg.	.50
Paraffin Solid, M. Pt. 60° to 62° C.	lb.	pkg.	$ .55
	5 lb.	pkg.	.50
Paraffin Liquid, see Oil Paraffin			
Paraldehyde, U.S.P. $(CH_3.CHO)_3$	lb.	c.b.	$1.30
	5 lb.,	c.b., Per lb.,	1.20
Paranaphthalene, see Anthracene			
Paraphthalein, see Phenolphthalein			
Parapropylmetacresol, see Thymol			
Parawax, see Paraffin, Solid			
Parlodion, C.P.	oz.	c.b.	$1.50
Pear Oil, see Amyl Acetate			
Pearl Ash, see Potass. carbonate, crude			
Pepsin, U.S.P., powd.	oz.	c.b.	$ .55
	½ lb.	c.b.	2.25
Pepton, see Culture Media			
Perchloromethane, see Carbon Tetrachloride			
Permutit	½ lb.	c.b.	$1.25
	1 lb.	c.b.	2.00
Petroleum Ether, see Ether, Petrolic			
Petrolatum, white	lb.	tin	$ .50
	5 lb.	tin, Per lb.	.35
Petrolatum, yellow	lb.	tin	$ .35
	5 lb.	tin, Per lb.	.25
Phenacetin, see Acetphenetidin			
Phenol, see Acid, Carbolic			
Phenolphthalein (indic.) $C_{20}H_{14}O_4$	oz.	p.c.	$ .50
	lb.	p.c.	2.60
Phenolphthalein, solution	½ liter	c.b.	$1.95
	1 liter	c.b.	3.60

CHEMICALS AND REAGENTS

Name and Formula			Price
Phenolsulphonphthalein (Phenol Red)	**1 gm.**		**$1.75**
Phenolsulphonphthalein Tablets	Per 10 tablet box,		**$1.60**
Phenyl Hydroxide, see Acid, Carbolic			
Phenylhydrazine $C_6H_5NH.NH_2$	**oz.**	c.b.	**$ .85**
	¼ lb.	c.b.	**2.80**
Phenylhydrazine Hydrochloride $C_6H_8N_2.HCl$	**oz.**	c.b.	**$ .60**
	¼ lb.	c.b.	**2.00**
Phenylmethane, see Toluene			
Phloroglucin (Phloroglucinol) $C_6H_6O_3+2H_2O$	**oz.**	c.b.	**$6.15**
Phosphoric Anhydride, see Acid Phosphoric anhydride			
Phosphorus Red, amorphous P_4	**¼ lb.**	tin	**$ .70**
	lb.	tin	**2.00**
Phosphorus Yellow, sticks P_4	**¼ lb.**	tin	**$ .45**
	lb.	tin	**1.20**
Phosphorus Yellow, sticks thin, 3/16 in., for gas analysis P_4	**½ lb.**	tin	**$1.15**
	lb.	tin	**1.75**
Phosphorus Oxychloride, C.P., liq., $POCl_3$	**¼ lb.**	g.s.b.	**$ .90**
	lb.	g.s.b.	**2.00**
Phosphorus Pentachloride, C.P., liq., PCl_5	**¼ lb.**	g.s.b.	**$ .55**
	lb.	g.s.b.	**1.45**
Phosphorus Pentoxide, see Acid Phosphoric anhydride			
Phosphorus Trichloride, PCl_3	**¼ lb.**	g.s.b.	**$ .70**
	lb.	g.s.b.	**1.45**
Photol (Metol)	**oz.**	c.b.	**$ .75**
	½ lb.	c.b.	**3.60**
Plaster Paris, see Calcium Sulfate calcined			
Platinum Asbestos 5%, see Asbestos			
Platinum (ic) **Chloride,** C.P., dry, cryst., $PtCl_4.2HCl+6H_2O$	**gm.**	vial	**$3.55**
	10 gm.	vial, Per gm.	**3.05**
Platinum (ic) **Chloride,** Solut. 5%	**oz.**	g.s.b.	**$4.50**
Platinum (ic) **Chloride,** Solut. 10%	**oz.**	g.s.b.	**$7.60**
Platinum (ic) **Potass. Chloride,** cryst., $PtCl_4.2KCl$	**gm.**	vial	**$3.60**
Potash Lye, see Potassium Hydroxide Com'l			
Potassium Metal, Balls, K	**oz.**	c.s.b.	**$1.60**
	lb.	c.s.b.	**13.50**
Potassium Acetate, C.P., cryst., $KC_2H_3O_2$	**lb.**	c.b.	**$1.00**
	5 lb.	c.b., Per lb.	**.90**
Potassium Acid Phosphate, see Potass. Biphosphate			
Potassium Acid Sulphate, see Potass. Bisulfate			
Potassium Alum, see Alumin Potass. Sulfate			
Potassium Arsenate, C.P., secondary, K_2HASO_4	**½ lb.**	c.b.	**$1.50**
	lb.	c.b.	**2.50**
Potassium Arsenite, C.P., $KAsO_2+H_3AsO_3$	**¼ lb.**	c.b.	**$ .85**
	lb.	c.b.	**2.20**
Potassium Bicarbonate, C.P., cryst., $KHCO_3$	**lb.**	c.b.	**$ .80**
	5 lb.,	c.b., Per lb.	**.75**
Potassium Bicarbonate, Com'l cryst.	**lb.**	p.c.	**$ .45**
	5 lb.,	p.c., Per lb.	**.35**
Potassium Bichromate, C.P., cryst	**lb.**	c.b.	**$ .95**
	5 lb.,	c.b., Per lb.	**.75**
Potassium Bichromate, cryst. techn., $K_2Cr_2O_7$	**lb.**	p.c.	**$ .35**
	5 lb.,	p.c., Per lb.	**.30**
Potassium Binoxalate, C.P., cryst	**¼ lb.**	c.b.	**$ .60**
	lb.	c.b.	**1.45**
Potassium Bisulfate, cryst., C.P., $KHSO_4$	**lb.**	c.b.	**$ .90**
	5 lb.,	c.b., Per lb.	**.75**
Potassium Bisulfate, fused, C.P.	**lb.**	c.b.	**$1.00**
	5 lb.,	c.b., Per lb.	**.80**
Potassium Bisulfite, C.P., cryst., $KHSO_3$	**lb.**	c.b.	**$1.35**
	5 lb.,	c.b., Per lb.	**1.30**
Potassium Bisulfite Meta- (Pyrosulfite) C.P., $K_2S_2O_5$	**lb.**	c.b.	**$ .95**
	5 lb.,	c.b., Per lb.	**.90**
Potassium Bitartrate, crude (Argols) powd.	**lb.**	p.c.	**$ .55**
	5 lb.,	p.c., Per lb.	**.50**
Potassium Bitartrate, powd., C.P., $KHC_4H_4O_6$	**lb.**	c.b.	**$1.20**
	5 lb.,	c.b., Per lb.	**1.10**
Potassium Bitartrate, powd., (Cream Tartar), U.S.P., powd	**lb.**	p.c.	**$ .60**
	5 lb.,	p.c., Per lb.	**.55**
Potassium Bromate, C.P., cryst., $KBrO_3$	**½ lb.**	c.b.	**$1.10**
	lb.	c.b.	**1.60**
Potassium Bromide., C.P., KBr	**½ lb.**	c.b.	**$ .75**
	lb.	c.b., Per lb.	**1.00**
Potassium Bromide., gran. U.S.P.	**½ lb.**	c.b.	**$ .75**
	lb.	c.b.	**.90**
Potassium Carbonate, cryst., C.P.	**lb.**	c.b.	**$ .75**
	5 lb.,	c.b., Per lb.	**.60**
Potassium Carbonate, C.P., anhyd.	**lb.**	c.b.	**$ .75**
	5 lb.	c.b.	**.60**
Potassium Carbonate, crude (Pearl Ash)	**lb.**	p.c.	**$ .40**
	5 lb.,	p.c., Per lb.	**.35**

CHEMICALS AND REAGENTS

Name and Formula			Price
Potassium Chlorate, C.P., cryst., $KClO_3$	lb.	c.b.	$ .80
	5 lb.	c.b., Per lb.	.65
Potassium Chlorate, U.S.P., powd	lb.	tin	$ .40
	5 lb.	tin, Per lb.	.35
Potassium Chloride, C.P., cryst., KCl	lb.	c.b.	$ .75
	5 lb.	c.b., Per lb.	.60
Potassium Chloride, Nitrogen Free, cryst	lb.	p.c.	$ .45
	5 lb.	p.c., Per lb.	.40
Potassium Chromate, C.P., cryst., K_2CrO_4	lb.	c.b.	$1.15
	5 lb.	c.b., Per lb.	1.00
Potassium Chromate, pure cryst	lb.	p.c.	$ .75
	5 lb.	p.c., Per lb.	.70
Potassium Citrate, C.P., cryst., $K_3C_6H_5O_7+H_2O$	½ lb.	c.b.	$1.25
	lb.	c.b.	1.85
Potassium Cyanate, C.P., cryst., KCNO	½ lb.	c.b.	$3.45
	lb.	c.b.	5.85
Potassium Cyanide, C.P., 98–100%, KCN	lb.	c.b.	$1.80
	5 lb.	c.b., Per lb.	1.60
Potassium Ferricyanide, C.P., cryst., $K_3Fe(CN)_6$	lb.	c.b.	$1.80
	5 lb.	c.b., Per lb.	1.60
Potassium Ferricyanide, tech., cryst	lb.	c.b.	$ .95
	5 lb.	c.b., Per lb.	.90
Potassium Ferrocyanide, anhydr., pure	lb.	tin	$ .65
	5 lb.	tin, Per lb.	.60
Potassium Ferrocyanide, cryst., C.P., $K_4Fe(CN)_6+3H_2O$	lb.	c.b.	$1.35
	5 lb.	c.b., Per lb.	1.20
Potassium Ferrocyanide, tech., cryst	lb.	c.b.	$ .65
Potassium Fluoride, C.P., cryst., $KF+2H_2O$	lb.	c.b.	$1.75
	5 lb.	c.b., Per lb.	1.65
Potassium Fluoride, fused, C.P.	lb.	c.b.	$1.85
	5 lb.	c.b., Per lb.	1.75
Potassium Hydroxide, C.P., by alcohol sticks, KOH	lb.	c.b.	$1.00
	5 lb.	c.b., Per lb.	.85
Potassium Hydroxide, Electrolytic sticks, U.S.P.	lb.	c.b.	$ .80
	5 lb.	c.b., Per lb.	.65
Potassium Hydroxide, techn., lump	lb.	tin	$ .35
	5 lb.	tin, Per lb.	.25
Potassium Hydroxide, Gas Absorbent Solution, see page 383			
Potassium Hydroxide, Normal Solution	liter	g.s.b.	$1.75
Potassium Hydroxide, $\frac{1}{10}$ Normal Solution	liter	g.s.b.	1.75
Potassium Iodate, C.P., KIO_3	¼ lb.	c.b.	$2.30
	lb.	c.b.	7.70
Potassium Iodide, cryst., C.P., KI	lb.	c.b.	$5.80
	5 lb.	c.b., Per lb.	5.50
Potassium Iodide, U.S.P.	lb.	c.b.	$5.45
	5 lb.	c.b., Per lb.	5.25
Potassium Iodide, C.P., Special Iodate Free, KI	½ lb.	c.b.	$3.65
	lb.	c.b.	6.20
Potassium Nitrate, C.P., cryst., KNO_3	lb.	c.b.	$ .80
	5 lb.	c.b., Per lb.	.65
Potassium Nitrate, C.P., sticks, fused	lb.	c.b.	$1.20
	5 lb.	c.b., Per lb.	1.05
Potassium Nitrate, coml., Saltpetre	lb.	p.c.	$ .30
	5 lb.	p.c., Per lb.	.25
Potassium Nitrite, C.P., cryst., KNO_2	lb.	c.b.	$1.55
	5 lb.	c.b., Per lb.	1.45
Potassium Nitrite, sticks, purified	lb.	c.b.	$1.50
	5 lb.	c.b., Per lb.	1.35
Potassium Oxalate, C.P., cryst., $K_2C_2O_4+H_2O$	½ lb.	c.b.	$ .80
	lb.	c.b.	1.15
Potassium Oxalate, C.P., anhydr.	½ lb.	c.b.	$1.25
	lb.	c.b.	1.85
Potassium Perchlorate, C.P., cryst., $KClO_4$	½ lb.	c.b.	$ .85
	lb.	c.b.	1.20
Potassium Permanganate, C.P., cryst., $KMNO_4$	lb.	c.b.	$1.00
	5 lb.	c.b., Per lb.	.80
Potassium Permanganate, U.S.P., cryst	lb.	can	$ .60
	5 lb.	can, Per lb.	.50
Potassium Permanganate, N/10 Solution	½ liter	c.b.	$1.50
	liter	c.b.	2.00
Potassium Persulfate, C.P., powd., $K_2S_2O_8$	½ lb.	c.b.	$ .80
	lb.	c.b.	1.15
Potassium Phosphate, primary, C.P., KH_2PO_4	½ lb.	c.b.	$ .90
	lb.	c.b.	1.30
Potassium Phosphate, secondary, C.P., K_2HPO_4	½ lb.	c.b.	$1.50
	lb.	c.b.	1.50

Prices include containers except where otherwise noted. All prices are subject to market fluctuations.

CHEMICALS AND REAGENTS

Name and Formula			Price
Potassium Pyroantimoniate C.P., $K_2H_2Sb_2O_7$	oz.	c.b.	$ .55
	lb.	c.b.	2.40
Potassium Platinum Salts, see Platinum			
Potassium Pyrogallate, (Gas Analysis), see page 383			
Potassium Pyrosulfate, see Pot. Bisulfate fused			
Potassium Pyrosulfite, pure, see Pot. Sulfite, Meta			
Potassium Silicate, pure gran., K_2SiO_3	lb.	c.b.	$1.60
	5 lb.	c.b.	1.50
Potassium Sulfate, C.P., cryst., K_2SO_4	lb.	c.b.	$ .85
	5 lb.	c.b., Per lb.	.70
Potassium Sulfate, C.P., powder	lb.	c.b.	$ .85
	5 lb.	c.b., Per lb.	.70
Potassium Sulfate Acid, see Pot., Bisulfate			
Potassium Sulfide, C.P., cryst., K_2S	½ lb.	c.b.	$1.20
	lb.	c.b.	1.80
Potassium Sulfide, C.P., fused	½ lb.	c.b.	$ .95
	lb.	c.b.	1.35
Potassium Sulfite, C.P., $K_2SO_3+2H_2O$	¼ lb.	c.b.	$ .60
	lb.	c.b.	1.40
Potassium Sulfocyanate, see Potassium Thiocyanate			
Potassium Tartrate, C.P., cryst, $2K_2C_4H_4O_6+H_2O$	lb.	c.b.	$2.05
	5 lb.	c.b., Per lb.	1.95
Potassium Tetroxalate, C.P., cryst., $KHC_2O_4.H_2C_2O_4+2H_2O$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Potassium Thiocyanate, C. P., cryst., KCNS	lb.	c.b.	$1.50
	5 lb.	c.b., Per lb.	1.35
Primuline, see Stains			
Pumice, lump	lb.	pkg.,	$ .30
	5 lb.	pkg., Per lb.	.25
Pumice, powd	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.15
Pyridine, C.P	¼ lb.	c.b.	$1.15
	lb.	c.b.	3.45
Pyrogallol, see Acid Pyrogallic			
Pyrolusite, see Manganese Dioxide, native			

Q

Name and Formula			Price
Quinine Sulfate $(C_{20}H_{24}N_2O_2)_2.H_2SO_4+7H_2O$	oz.	c.b.	$1.15
Quick Lime, see Calcium Oxide, coml., unslaked lime			
Quinol, see Hydroquinone			

R

Name and Formula			Price
Raffinos	10 gms.		$6.60
Red Lead, see Lead Oxide			
Resorcin, Resorcinol, resubl., $C_6H_6O_2$	oz.	c.b.	$ .60
	lb.	c.b.	4.20
Resorcinolphthalein, see Fluorescein			
Rochelle Salt, see Sod. and Potass. Tartrate			
Rock Candy	lb.	p.c.	$ .60
	5 lb.	p.c., Per lb.	.55
Rock Salt	lb.	pkg.	$ .10
	5 lb.	pkg., Per lb.	.05
Romanowsky's Stain, see Giemsa Stain under Stains			
Rosaniline, HCL, see Stains			
Rosalic Acid, see Corallin under Stains			
Rosin Yellow (Colophony), lump	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.15
Rosin Yellow, powder	lb.	pkg.	$ .45
	5 lb.	pkg., Per lb.	.35
Rouge—Jewellers, powd	lb.	p.c.	$ .70
	5 lb.	p.c., Per lb.	.65
Rouge—Jewellers, sticks	lb.	pkg.	$ .80
	5 lb.	pkg., Per lb.	.75

S

Name and Formula			Price
Saccharose (Sucrose Sugar), C.P., $C_{12}H_{22}O_{11}$	lb.	c.b.	$1.20
	5 lb.	c.b., Per lb.	1.10
Saccharose, tech	lb.	pkg.	$ .25
	5 lb.	pkg., Per lb.	.20
Saccharose, Bacto, see Culture Media			
Safranine, see Stains			
Sal Ammoniac, see Ammonium Chloride			
Sal Soda, see Sodium Carbonate, cryst., tech.			
Salicin, U.S.P., $C_{13}H_{13}O_2(OH)_5$	oz.	p.c.	$ .75
	lb.	p.c.	7.05
Salicylic Aldehyde (B.Pt.73–74° C, 10mm.)	25 gm.	g.s.b.	$2.70
	100 gm.	g.s.b	7.65
Salt, see Sodium Chloride			
Saltcake, see Sod. Bisulfate, techn.			
Saltpetre, see Pot. Nitrate			
Sand, Berkshire, for Water Analysis, see page 563			
Sand, Sea	5 lb.	pkg., Per lb.	$ .10
	25 lb.	pkg., Per lb.	.09
Sand, Sea, washed and ignited	lb.	p.c.	$ .30
	5 lb.	p.c., Per lb.	.25
Sand, Silica, powdered	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.10
Sand, Standard, for Cement Testing, see page 157			

CHEMICALS AND REAGENTS

Name and Formula		Price
Saponin	oz. c.b.	$ .60
Scarlet Red, see Stains		
Sealing Wax, see Wax		
Seignette Salt, see Sod. Pot. Tartrate		
Selenium, powd	oz. p.c.	$ .50
	lb. p.c.	5.95
Shellac Orange, flake	½ lb. p.c.	$1.00
	lb. p.c.	1.65
Silica, powd., see Sand		
Silver Metal, foil, Ag	oz.	$2.65
Silver Metal, leaf Ag	Book	$ .50
	5 bks., Per book	.45
Silver Bromide $AgBr$	oz. c.b.	$1.45
Silver Carbonate Ag_2CO_3	oz. c.b.	$1.60
Silver Chloride, pure $AgCl$	oz. c.b.	$1.40
Silver Cyanide, pure $AgCN$	oz. c.b.	$1.55
Silver Lactate $AgC_3H_5O_3+H_2O$	oz. c.b.	$1.40
Silver Nitrate, C.P., cryst., $AgNO_3$	oz. c.b.	$1.00
¼ lb. c.b. $3.50, ½ lb. c.b. $6.00, lb. c.b. $11.25		
Silver Nitrate, N/10 Solution	liter r.s.b.	$3.25
Silver Nitrite, C.P., $AgNO_2$	oz. c.b.	$1.75
Silver Oxide, C.P., powd., Ag_2O	oz. c.b.	$1.90
Silver Sulfate, C.P., cryst., Ag_2SO_4	oz. c.b.	$1.30
Sinderite, see page 256		
Soap Castile, white bars	lb. pkg.	$ .75
	5 lb. pkg., Per lb.	.70
Soap Castile, white powd	lb. pkg.	$1.00
	5 lb. pkg., Per lb.	.95
Soap Soft (Green Soap) U.S.P.	lb. jar	$ .60
	5 lb. jar, Per lb.	.50
Soap Solution, Standard	liter c.b.	$2.50
Soda Ash, see Sodium Carbonate calcined, tech.		
Soda Lime, see Sodium Calc. Hydrate		
Sodium Metal Na	oz. tin	$ .30
	lb. tin	1.35
Sodium Acetate, C.P., cryst., $NaC_2H_3O_2+3H_2O$	lb. c.b.	$ .75
	5 lb. c.b., Per lb.	.70
Sodium Acetate, cryst., anhyd	lb. c.b.	$1.30
	5 lb. c.b., Per lb.	1.10
Sodium Acetate, tech., cryst	lb. c.b.	$ .45
	5 lb. c.b., Per lb.	.40
Sodium Alum, see Alumin. Sod. sulfate		
Sodium Aluminate, C.P., $Na_2Al_2O_4$	lb. c.b.	$ .80
	5 lb. c.b., Per lb.	.75
Sodium Ammon. Phosphate, C.P., cryst. (Microcosmic Salt), $NaNH_4HPO_44H_2O$	lb. c.b.	$ .95
	5 lb. c.b., Per lb.	.85
Sodium Arsenate, C.P., $Na_2HAsO_4+7H_2O$	½ lb. c.b.	$ .75
	lb. c.b.	1.05
Sodium Arsenite, C.P., powd., $NaAsO_2$	lb. c.b.	$1.20
	5 lb. c.b., Per lb.	1.10
Sodium Benzene Sulfonate $NaC_6H_5SO_3$	250 gm. tin	$1.30
	500 gm. tin	2.15
Sodium Benzoate, U.S.P., powd., $NaC_7H_5O_2+H_2O$	½ lb. p.c.	$1.00
	lb. p.c.	1.45
Sodium Biborate, see Sodium Borate		
Sodium Bicarbonate, C.P., powd., $NaHCO_3$	lb. c.b.	$ .35
	5 lb. c.b., Per lb.	.25
Sodium Bicarbonate, pure, coml	lb. p.c.	$ .20
	5 lb. p.c., Per lb.	.10
Sodium Bichromate, C.P., cryst., $Na_2Cr_2O_7+2H_2O$	lb. c.b.	$1.00
	5 lb. c.b., Per lb.	.95
Sodium Bichromate, tech	lb. tin	$ .35
	5 lb. tin, Per lb.	.30
Sodium Bismuthate, C.P., powd	lb. c.b.	$5.25
	5 lb. c.b., Per lb.	5.00
Sodium Bisulfate, C.P., cryst., $NaHSO_4+H_2O$	lb. c.b.	$ .60
	5 lb. c.b., Per lb.	.50
Sodium Bisulfate, C.P., fused powd	lb. c.b.	$1.00
	5 lb. c.b., Per lb.	.90
Sodium Bisulfite, C.P., powd., $NaHSO_3$	lb. c.b.	$ .60
	5 lb. c.b., Per lb.	.45
Sodium Bisulfite, tech., powd	lb. p.c.	$ .25
	5 lb. p.c., Per lb.	.20
Sodium Bitartrate, C.P $NaHC_4H_4O_6+H_2O$	lb. c.b.	$1.45
	5 lb. c.b., Per lb.	1.30
Sodium Borate, C.P., cryst., $Na_2B_4O_7+10H_2O$	lb. c.b.	$ .55
	5 lb. c.b., Per lb.	.45
Sodium Borate, C.P., powd., anhyd	½ lb. c.b.	$ .85
	lb. c.b.	1.20

CHEMICALS AND REAGENTS

Name and Formula			Price
Sodium Borate (Borax)	**lb.**	pkg.	**$ .20**
	5 lb.	pkg.	**.17**
Sodium Borate, fused, ground (Borax Glass)	**lb.**	p.c.	**$ .45**
	5 lb.	p.c., Per lb.	**.40**
Sodium Bromide, C.P., cryst., NaBr	**lb.**	c.b.	**$ .95**
	5 lb.	c.b., Per lb.	**.85**
Sodium Calcium Hydrate, dry, 2% moisture, 4, 8, 12, 20, 40 or 60 mesh (Soda Lime)	**lb.**	c.b.	**$ .80**
	5 lb.	c.b., Per lb.	**.65**
Sodium Calcium Hydrate, Wilson Soda Lime, see page 313			
Sodium Calcium Hydrate, 15% H_2O for CO_2 Det., 8 or 12 mesh (Soda Lime)	**lb.**	c.b.	**$ .80**
	5 lb.	c.b., Per lb.	**.65**
Sodium Carbonate, C.P., cryst., $Na_2CO_3+10H_2O$	**lb.**	c.b.	**$ .50**
	5 lb.	c.b., Per lb.	**.40**
Sodium Carbonate, C.P., anhydr	**lb.**	c.b.	**$ .60**
	5 lb.	c.b., Per lb.	**.50**
Sodium Carbonate, tech., cryst. (Sal. Soda)	**lb.**	pkg.	**$ .15**
	5 lb.	pkg., Per lb.	**.10**
Sodium Carbonate, calcined, tech. (Soda Ash)	**lb.**	pkg.	**$ .15**
	5 lb.	pkg., Per lb.	**.10**
Sodium Carbonate, Normal Solution	**liter**	c.b.	**$1.75**
Sodium Carbonate, N/10 Solution	**liter**	c.b.	**$1.75**
Sodium Carbonate, N/50 Solution	**liter**	c.b.	**$1.75**
Sodium Chlorate, C.P., cryst., $NaClO_3$	**lb.**	c.b.	**$ .80**
	5 lb.	c.b., Per lb.	**.75**
Sodium Chlorate, pure	**lb.**	p.c.	**$ .50**
	5 lb.	p.c., Per lb.	**.40**
Sodium Chloride, C.P., cryst., NaCl	**lb.**	c.b.	**$ .50**
	5 lb.	c.b., Per lb.	**.40**
Sodium Chloride, C.P., cryst., fused	**lb.**	c.b.	**$ .95**
	5 lb.	c.b., Per lb.	**.85**
Sodium Chloride, tech., (table salt)	**lb.**	pkg.	**$ .10**
	5 lb.	pkg., Per lb.	**.05**
Sodium Chloride, Rock Salt	**1 lb.**	pkg.	**$ .10**
	5 lb.	pkg., Per lb.	**.05**
Sodium Chromate, acid, see Sod. Bichromate			
Sodium Chromate, C.P., cryst., $Na_2CrO_4+10H_2O$	**½ lb.**	c.b.	**$ .85**
	lb.	c.b.	**1.20**
Sodium Citrate, C.P., cryst., $2Na_3C_6H_5O_7+11H_2O$	**lb.**	c.b.	**$1.65**
	5 lb.	c.b., Per lb.	**1.45**
Sodium Cobaltic, Nitrite, C.P., powd	**oz.**	c.b.	**$ .95**

Name and Formula			Price
Sodium Cyanide, C.P.	**lb.**	c.b.	**$1.20**
	5 lb.	c.b., Per lb.	**1.10**
Sodium Cyanide Chloride Mixture, coml., 75–76%	**lb.**	tin	**$ .45**
	5 lb.	tin, Per lb.	**.40**
Sodium Dioxide, see Sod. Peroxide			
Sodium Ferrocyanide, C.P., cryst., $Na_4Fe(CN)_6+12H_2O$	**oz.**	c.b.	**$ .30**
	lb.	c.b.	**1.15**
Sodium Fluoride, C.P., powd., NaF	**½ lb.**	c.b.	**$ .75**
	lb.	c.b.	**1.00**
Sodium Fluoride, techn., powd	**lb.**	p.c.	**$ .40**
	5 lb.	p.c., Per lb.	**.35**
Sodium Formate, C.P., cryst., $NaCHO_2$	**oz.**	c.b.	**$ .35**
	lb.	c.b.	**1.50**
Sodium Hydrosulphite, powd., $Na_2S_2O_4$	**lb.**	c.b.	**$1.10**
	5 lb.	c.b., Per lb.	**.95**
Sodium Hydroxide-Asbestos, see Ascarite, page 251			
Sodium Hydroxide, C.P., by alcohol, sticks, NaOH	**lb.**	c.b.	**$ .80**
	5 lb.	c.b., Per lb.	**.65**
Sodium Hydroxide, pure electrolyt. sticks	**lb.**	c.b.	**$ .65**
	5 lb.	c.b., Per lb.	**.50**
Sodium Hydroxide, 98% gran.	**lb.**	tin	**$ .30**
	10 lb.	tin, Per lb.	**.20**
Sodium Hydroxide, Normal Solution	**liter**	c.b.	**$1.75**
Sodium Hydroxide, N/2 Solution	**liter**	c.b.	**$1.75**
Sodium Hydroxide, N/10 Solution	**liter**	c.b.	**$1.75**
Sodium Hydroxide, N/50 Solution	**liter**	c.b.	**$1.75**
Sodium Hypochlorite solution, C.P., NaOCl	**lb.**	c.b.	**$ .50**
	5 lb.	c.b., Per lb.	**.45**
Sodium Hyposulfite, see Sod. Thiosulfate			
Sodium Iodate, C.P., $NaIO_3$	**oz.**	c.b.	**$1.00**
Sodium Iodide, C.P., NaI	**¼ lb.**	c.b.	**$2.25**
	lb.	c.b.	**7.10**
Soda Lime, see Sod. Calcium Hydrate			
Sodium Nitrate, C.P., cryst., $NaNO_3$	**lb.**	c.b.	**$ .70**
	5 lb.	c.b., Per lb.	**.55**
Sodium Nitrate, powd., C.P.	**lb.**	c.b.	**$ .70**
	5 lb.	c.b., Per lb.	**.55**
Sodium Nitrate, coml	**lb.**	p.c.	**$ .20**
	5 lb.	p.c., Per lb.	**.15**

CHEMICALS AND REAGENTS

Name and Formula	Quantity	Price
Sodium Nitrite, techn.	lb. tin	$ .55
	5 lb. tin, Per lb.	.45
Sodium Nitrite, C.P., cryst., $NaNO_2$	lb. c.b.	$ .85
	5 lb. c.b., Per lb.	.70
Sodium Nitrite, C.P., sticks	lb. c.b.	$1.00
	5 lb. c.b., Per lb.	.95
Sodium Nitroprusside, tech., $Na_2Fe(CN)_5(NO)+2H_2O$	25 gm.	$ .75
Sodium Oleate, U.S.P., neut., powd., $NaC_{18}H_{33}O_2$	½ lb. c.b.	$ .75
	lb. c.b.	1.05
Sodium Oxalate, C.P., powd., $Na_2C_2O_4$	lb. c.b.	$1.15
	5 lb. c.b., Per lb.	1.00
Sodium Oxalate, C.P., special for Sorenson Standardization	¼ lb. c.b.	$1.10
	lb. c.b.	3.40
Sodium Perborate, C.P., powd., $NaBO_3+4H_2O$	½ lb. c.b.	$ .75
	lb. c.b.	1.00
Sodium Peroxide, C.P., Na_2O_2	lb. tin	$1.00
	5 lb. tin, Per lb.	.95
Sodium Peroxide, spec. Calorimeter, see page 134		
Sodium Peroxide, fused, see Ozone		
Sodium Phosphate, primary, (monobasic), C.P., cryst., $NaH_2PO_4+H_2O$	lb. c.b.	$1.00
	5 lb. c.b., Per lb.	.80
Sodium Phosphate secondary (dibasic), C.P., cryst., $Na_2HPO_4+12H_2O$	lb. c.b.	$ .75
	5 lb. c.b., Per lb.	.60
Sodium Phosphate secondary, coml., gran	lb. p.c.	$ .20
	5 lb. p.c., Per lb.	.15
Sodium Phosphate, tertiary (tribasic), C.P., cryst., $Na_3PO_4+12H_2O$	lb. c.b.	$ .90
	5 lb. c.b., Per lb.	.75
Sodium Potass. Carbonate, C.P., $NaKCO_3.6H_2O$	lb. c.b.	$1.15
	5 lb. c.b., Per lb.	1.10
Sodium Potass. Tartrate, C.P., cryst., $NaKC_4H_4O_6.4H_2O$	lb. c.b.	$1.10
	5 lb. c.b., Per lb.	.90
Sodium Potass. Tartrate, (Rochelle Salts), pure powd.	lb. p.c.	$ .60
	5 lb. p.c., Per lb.	.55
Sodium Pyrophosphate, C.P., cryst., $Na_4P_2O_7+10H_2O$	lb. c.b.	$ .95
	5 lb. c.b., Per lb.	.90
Sodium Salicylate, U.S.P.	¼ lb. p.c.	$ .35
	lb. p.c.	1.05
Sodium Silicate, cryst., C.P., $Na_2SiO_3+9H_2O$	lb. c.b.	$1.70
	5 lb. c.b., Per lb.	1.60
Sodium Silicate, techn., solut., 40–42° Be (Soda Waterglass)	gal. tin	$ .85
	5 gal. tin, Per gal.	.60
Sodium Silicate, powd.	lb. tin	$ .60
	5 lb. tin, Per lb.	.50
Sodium Stannate, C.P., powd., $Na_2SnO_3+3H_2O$	lb. c.b.	$1.60
	5 lb. c.b., Per lb.	1.50
Sodium Sulfate, C.P., cryst., $Na_2SO_4+10H_2O$	lb. c.b.	$ .60
	5 lb. c.b., Per lb.	.50
Sodium Sulfate, C.P., cryst., anhyd., Na_2SO_4	lb. c.b.	$ .80
	5 lb. c.b., Per lb.	.65
Sodium Sulfate, tech., cryst., $Na_2SO_4+10H_2O$	lb. p.c.	$ .20
	5 lb. p.c., Per lb.	.15
Sodium Sulfide, C.P., cryst., Na_2S+9H_2O	lb. c.b.	$ .85
	5 lb. c.b., Per lb.	.70
Sodium Sulfide, fused, coml.	lb. tin	$ .55
	5 lb. tin, Per lb.	.40
Sodium Sulfite, C.P., cryst., $Na_2SO_3+7H_2O$	lb. c.b.	$ .60
	5 lb. c.b., Per lb.	.50
Sodium Sulfite, C.P., anhyd., Na_2SO_3	lb. c.b.	$ .75
	5 lb. c.b., Per lb.	.60
Sodium Sulfite, pure cryst	lb. tin	$ .45
	5 lb. tin, Per lb.	.35
Sodium Sulfocyanate, see Sodium Thiocyanate		
Sodium Tetraborate, see Sod. Borate (Borax)		
Sodium Thiocyanate, C.P., cryst., NaCNS	lb. c.b.	$1.70
	5 lb. c.b., Per lb.	1.50
Sodium Thiosulfate (Hyposulphite), C.P., cryst., $Na_2S_2O_3+5H_2O$	lb. c.b.	$ .55
	5 lb. c.b., Per lb.	.45
Sodium Thiosulfate, C.P., anhyd., $Na_2S_2O_3$	lb. c.b.	$ .95
	5 lb. c.b., Per lb.	.75
Sodium Thiosulfate, tech., cryst., $Na_2S_2O_3+5H_2O$	lb. p.c.	$ .20
	5 lb. p.c., Per lb.	.10
Sodium Tungstate, C.P., cryst., $Na_2WO_4+2H_2O$	¼ lb. c.b.	$ .95
	lb. c.b.	2.80

SOLUTIONS—Special Test

Name and Formula	Quantity	Price
Benedict's Solution, Qualitative	100 ml. c.b.	$ .75
	liter c.b.	3.25
Benedict's Solution, Quantitative	100 ml. c.b.	$1.00
	liter c.b.	4.50
Solution Dimethylamidoazobenzol, 0.5% for gastric juice analysis (Toepfer), see Solution, Toepfer		

CHEMICALS AND REAGENTS

Name and Formula			Price
Solution, Esbach's, Albumen	100 ml.	c.b.	$ .50
	500 ml.	c.b.	2.25
Solution, Fehling's, "A" copper	pt.	c.b.	$1.35
	qt.	c.b.	2.40
Solution, Fehling's, "B" alkaline	pt.	c.b.	$1.35
	qt.	c.b.	2.40
Solution, Fehling's Copper			
Solution, Gram's Iodine			
Solution, Haine's, Glucose	100 ml.	c.b.	$ .50
Solution, Hayem's, Blood	100 ml.	c.b.	$ .65
	500 ml.	c.b.	3.00
Solution, Millon's, Albumen	100 ml.	c.b.	$ .85
Solution, Nessler's, Ammonia and Aldehyde	100 ml.	c.b.	$ .75
	500 ml.	c.b.	2.00
Solution, Obermayer's	100 ml.	c.b.	$ .65
	500 ml.	c.b.	3.00
Solution, Toepfer's, HCl in gastric juice	100 ml.	c.b.	$1.00
	500 ml.	c.b.	4.50
Solution, Toison's, Blood	100 ml.	c.b.	$ .70
	500 ml.	c.b.	3.10
Solution, Wijs Iodine	½ liter	g.s.b.	$3.50
	liter	g.s.b.	6.50
Stains, see separate list in the rear, page 601			
Stannic Chloride, C.P., cryst., $SnCl_4$	½ lb.	g.s.b.	$1.10
	lb.	g.s.b.	1.45
Stannous Chloride, C.P., cryst., $SnCl_2$	lb.	c.b.	$1.30
	5 lb.	c.b., Per lb.	1.10
Stannous Chloride, tech., cryst.	lb.	c.b.	$1.05
	5 lb.	c.b., Per lb.	1.00
Stannous Sulphate, C.P., powd., $SnSO_4$	lb.	c.b.	$1.70
	5 lb.	c.b., Per lb.	1.60
Stannum (Tin), see Tin			
Starch, Arrow-Root	½ lb.	p.c.	$ .55
	lb.	p.c.	.80
Starch, Corn	lb.	p.c.	$ .20
	5 lb.	p.c., Per lb.	.15
Starch, Iodized	oz.	c.b.	$ .45
	½ lb.	c.b.	1.25
Starch, Potato	lb.	p.c.	$ .50
	5 lb.	p.c., Per lb.	.40
Starch, Soluble, according to Lintner	lb.	c.b.	$1.75
	5 lb.	c.b., Per lb.	1.65
Starch, Soluble, C.P., powd.	½ lb.	c.b.	$1.00
	lb.	c.b.	1.50

Name and Formula			Price
Starch, Sugar, see Dextrose			
Starch, Wheat, pure	lb.	p.c.	$ .50
	5 lb.	p.c., Per lb.	.45
Starch, Wheat, coml.	lb.	p.c.	$ .25
	5 lb.	p.c., Per lb.	.21
Steel Wool, No. 1	lb.	pkg.	$ .60
	5 pkgs.,	Per pkg.	.55
Strontium Carbonate, C.P., powd., $SrCO_3$	lb.	c.b.	$1.30
	5 lb.	c.b., Per lb.	1.20
Strontium Chloride, C.P., cryst., $SrCl_2+6H_2O$	lb.	c.b.	$1.00
	5 lb.	c.b., per lb.	.90
Strontium Hydroxide, C.P., cryst., $Sr(OH)_2+8H_2O$	lb.	c.b.	$1.75
	5 lb.	c.b., Per lb.	1.65
Strontium Nitrate, C.P., cryst., $Sr(NO_3)_2$	lb.	c.b.	$1.10
	5 lb.	c.b., Per lb.	.95
Strontium Nitrate, pure, cryst.	lb.	c.b.	$ .65
	5 lb.	c.b., Per lb.	.60
Strontium Sulfate, C.P., $SrSO_4$	¼ lb.	c.b.	$ .55
	lb.	c.b.	1.25
Succrose, see Saccharose			
Sudan III, see Stains			
Sugar, Cane, see Saccharose			
Sugar, Grape, see Dextrose			
Sugar, Lead, see Lead Acetate			
Sugar, Manna, see Mannit			
Sugar, Milk, see Lactose			
Sulfur Roll (Brimstone)	lb.	p.c.	$ .20
	5 lb.	tin, Per lb.	.13
Sulfur Sublimed (Sulfur Flowers)	lb.	p.c.	$ .20
	5 lb.	tin, Per lb.	.15
Sulfur Chloride, liquid, S_2Cl_2	¼ lb.	g.s.b.	$ .60
	lb.	g.s.b.	.95
Sulfur Dioxide, see page 369			

T

Name and Formula			Price
Table Salt, see Sodium Chloride, coml.			
Talcum, Powd., purif.	lb.	pkg.	$ .20
	5 lb.	pkg., Per lb.	.15
Tannin, see Acid Tannic			
Tartar Emetic, see Antimon. Pot. Tartrate			
Terpinol $C_{10}H_{18}O$	lb.	c.b.	$1.10
Test Lead, see Lead Metal			
TEST PAPERS, see page 543			
Tetrachloromethane, see Carbon Tetrachloride			
Tetraoxyphthalophenonanhydride, see Fluoresceine			
Theine, see Caffeine			

CHEMICALS AND REAGENTS

Name and Formula			Price
Thermit	lb.	pkg.	$1.80
	5 lb.	pkg., Per lb.	1.70
Thionine, see Stains			
Thiourea (M. Pt. 170–174°C)	100 gm.	c.b.	$2.70
	250 gm.	c.b.	5.45
Thorium Nitrate, C.P., $Th(NO_3)_4+4H_2O$	¼ lb.	c.b.	$1.40
	lb.	c.b.	4.55
Thymol, cryst., U.S.P., $C_{10}H_{14}O$	oz.	c.b.	$ .90
Tin, Foil, Sheet	lb.	pkg.	$ .50
	5 lb.	pkg., Per lb.	.45
Tin, Foil, 3-inch discs, 120 to the lb.	lb.	pkg.	$ .90
	5 lb.	pkg., Per lb.	.80
Tin, mossy, Sn	lb.	p.c.	$1.20
	5 lb.	p.c., Per lb.	1.15
Tin, powd., 20 mesh	lb.	tin	$1.35
	5 lb.	tin, Per lb.	1.20
Tin, powd., 30 mesh	lb.	tin	$1.35
	5 lb.	tin, Per lb.	1.20
Tin, shot	lb.	tin	$1.20
	5 lb.	tin, Per lb.	1.15
Tin, sticks, 4-inch lengths	½ lb.	pkg.	$ .75
	lb.	pkg.	1.20
Tin Salts, see Stannic and Stannous			
Titanium Oxide, C.P.	¼ lb.	c.b.	$1.15
	lb.	c.b.	3.55
Toepfer's Solution (HCl in Gastric Juice)	100 ml.	c.b.	$1.00
	500 ml.	c.b.	4.50
Toison's Blood Solution	100 ml.	c.b.	$ .70
	500 ml.	c.b.	3.10
Tolidin (Ortho), powd., $C_{14}H_{16}N_2$	100 gm.	c.b.	$2.25
Tolidin (ortho), Soln., (A.P.H.A.)	liter	c.b.	$2.00
Toluene, (Toluol or Methylbenzene), pure., $CH_3C_6H_5$	gal.	tin	$1.05
	5 gal.	tin, Per gal.	.85
Toluene $C_6H_5.CH_3$	lb.	c.b.	$ .70
	5 lb.	c.b., Per lb.	.55
Toluidine (Ortho), tech., $C_6H_4.CH_3.NH_2$	lb.	c.b.	$1.60
	5 lb.	c.b. Per lb.	1.50
Toluidine, Blue, see Stains			
Trichloromethane, see Chloroform			
Trinitrophenol, see Acid Picric			
Tripoli, powd	lb.	p.c.	$ .20
	5 lb.	p.c., Per lb.	.15
Turmeric, powd	lb.	c.b.	$ .45
Turpentine Spirits, see Oil Turpentine			
Uranium (Uranyl), Acetate, C.P., $UO_2.(C_2H_3O_2)+2H_2O$	¼ lb.	c.b.	$2.00
	lb.	c.b.	6.35

Name and Formula			Price
Uranium Nitrate, Na free, U.S.P., $UO_2(NO_3)_2+6H_2O$	¼ lb.	c.b.	$1.20
	lb.	c.b.	3.65
Urea, C.P., $CO(NH_2)_2$	¼ lb.	c.b.	$ .70
	lb.	c.b.	1.70
Urea, U.S.P	¼ lb.	c.b.	$ .50
	lb.	c.b.	.95
Urease, Tablets	500 Tablet	c.b.	$7.30
Vanadium Chloride, C.P., cryst., $2VO_2.4HCl+3H_2O$	oz.	c.b.	$2.15
Vanillin $C_8H_8O_3$	oz.	tin	$1.00
Vaselin, see Petrolatum			
Veal, Bacto, see Culture Media			
Verdigris, see Copper Acetate			
Water Distilled	1 gal.	c.b., **$.30,** bottle, **40c** extra	
	5 gal.	c.b., **$.25,** per gal., bottle, **$1.75** extra	
	12 gal.	carboy, **$.20** per gal., carboy **$10.00** extra	
Water, Glass, see Sodium Silicate			
Wax, Japan	lb.	pkg.	$ .70
	5 lb.	pkg., Per lb.	$ .65
Wax, Mineral, see Ceresin			
Wax, Paraffin, see Paraffin			
Wax, Sealing, see page 567			
Wax, Yellow, Bees	lb.	pkg.	$1.00
	5 lb.	pkg., Per lb.	.95
White Arsenic, see Acid Arsenous			
White Lead, see Lead carbonate			
Wijs Iodine Solution	½ liter	g.s.b.	$3.50
	liter	g.s.b	6.50
Wood Alcohol, see Alcohol Methylic			
Wool Fat, see Lanum			
Wright's Stain, see Stains			
Xylene (Xylol), C.P., $C_6H_4(CH_3)_2$	lb.	c.b.	$ .65
	5 lb.	c.b., Per lb.	.50
Xylene, pure	gal.	tin	$1.45
	5 gal.	tin, Per gal.	1.25

Z

Name and Formula			Price
Zinc, C.P., mossy, Zn	lb.	p.c.	$ .45
	5 lb.	p.c., Per lb.	.40
Zinc, C.P., powd., 10 mesh	lb.	c.b.	$ .85
	5 lb.	c.b., Per lb.	.70
Zinc, C.P., powd., 20 mesh	lb.	c.b.	$ .70
	5 lb.	c.b., Per lb.	.55
Zinc, C.P., powd., 30 mesh	lb.	c.b.	$ .70
	5 lb.	c.b., Per lb.	.55
Zinc, C.P., powd., 40 mesh	lb.	c.b.	$1.00
	5 lb.	c.b., Per lb.	.90

CHEMICALS AND REAGENTS

Name and Formula		Price
Zinc, C.P., powd., dust	**lb.** c.b.	\$ .65
	5 lb. c.b., Per lb.	.50
Zinc, C.P., shot	**lb.** p.c.	\$ .80
	5 lb. p.c., Per lb.	.65
Zinc, C.P., sticks	**lb.** pkg.	\$ .50
	5 lb. pkg., Per lb.	.46
Zinc, C.P., Special Arsenic free, mossy	**lb.** c.b.	\$ .45
	5 lb. c.b., Per lb.	.40
Zinc, C.P., Special Arsenic free, powd., 20 mesh	**lb.** c.b.	\$1.50
	5 lb. c.b., Per lb.	1.40
Zinc, amalgamated, powd.	**lb.** c.b.	\$1.80
	5 lb. c.b., Per lb.	1.60
Zinc, coml., mossy	**lb.** p.c.	\$ .30
	5 lb. p.c., Per lb.	.25
Zinc, coml., powd. (Dust)	**lb.** p.c.	\$ .35
	5 lb. p.c., Per lb.	.30
Zinc, coml., sheet	**lb.** pkg.	\$ .35
	5 lb. pkg., Per lb.	.30
Zinc Strips, for Standardizing, 6½x½ inches	**lb.** pkg.	\$ .80
	5 lb. pkg., Per lb.	1.15
Zinc Metal, pure turnings for H_2O analysis	**lb.** p.c.	\$ .75
	5 lb. p.c., Per lb.	.70
Zinc Acetate, C.P., cryst., $Zn(C_2H_3O_2)_2+3H_2O$	**¼ lb.** c.b.	\$ .50
	lb. c.b.	1.10
Zinc Carbonate, C.P., powd., $2ZnCO_3$	**lb.** c.b.	\$1.35
	5 lb. c.b., Per lb.	1.30

Name and Formula		Price
Zinc Chloride, C.P., gran., $ZnCl_2$	**lb.** c.b.	\$ .90
	5 lb. c.b., Per lb.	.75
Zinc Chloride, C.P., sticks	**lb.** c.b.	\$1.10
	5 lb. c.b., Per lb.	1.05
Zinc Chloride, tech.	**lb.** tin	\$ .50
	5 lb. tin, Per lb.	.35
Zinc Nitrate, C.P., cryst., $Zn(NO_3)_2$	**lb.** c.b.	\$1.05
	5 lb. c.b., Per lb.	1.00
Zinc Oxide, C.P., dry process, Mn. free, ZnO	**lb.** p.c.	\$ .60
	5 lb. p.c., Per lb.	.55
Zinc Oxide, wet process, powd.	**lb.** c.b.	\$ .95
	5 lb. c.b., Per lb.	.90
Zinc Stearate $Zn(C_{18}H_{35}O_2)_2$	**lb.** p.c.	\$ .75
	5 lb. p.c., Per lb.	.70
Zinc Sulfate, C.P., cryst., $ZnSO_4+7H_2O$	**lb.** c.b.	\$ .65
	5 lb. c.b., Per lb.	.50
Zinc Sulfate tech. cryst	**lb.** p.c.	\$ .20
	5 lb. p.c. Per lb.	.15
Zinc Sulfate, C.P., anhyd., powd., $ZnSO_4$	**lb.** c.b.	\$ .95
	5 lb. c.b., Per lb.	.90
Zinc Sulfide, C.P., powd., ZnS	**¼ lb.** c.b.	\$ .75
	lb. c.b.	1.75

Prices include containers except where otherwise noted. **All prices are subject to market fluctuations.**

ONE OF THE AISLES IN OUR CHEMICAL DEPARTMENT

BACTERIOLOGICAL CULTURE MEDIA AND REAGENTS

CULTURE MEDIA REAGENTS

Bacto-Agar, "Difco" Standardized, is a purified, dried, granular form of Agar-Agar. Extraneous matter, pigments, salts, etc., are reduced to a minimum. Pectins are retained. Non-agel fractions are removed. Moisture is minimal. For analytical comparison with other agar cf. C. R. Fellers, *Jour. Ind. & Eng. Chem., Vol. VIII, No. 12, Dec., 1916.* **1-lb.** carton, **$3.00**

Agar, Chopped Shreds, "Difco" Standardized, is a carefully selected, extra quality of Japanese Agar-Agar, exactly in the form obtained from Japan, except that it is reduced mechanically to small flakes, of convenient size for packing, weighing, and dissolving. It is not processed for purification like Bacto-Agar. **1-lb.** carton, **$2.75**

Gelatine, Gold Label, Kahlbaum's.
500 gram pkg., **$2.20**

Bacto-Gelatine, "Difco" Standardized. The first gelatine prepared expressly for Bacteriologists. It surpasses all present requirements, including those of "Standard Methods" 1923. It is in granular form, therefore easily handled. It is very light in color, of low acidity, requiring little adjustment, quickly and completely soluble in water at 60° C., a 10% solution being light in color and bright in appearance; it filters readily. Its melting point in 10% strength is higher than 30° C. Standard culture media prepared from it have a melting point of 25°–28° C. **1-lb.** carton, **$2.50**

Bacto-Beef Extract, "Difco" Standardized, is especially adapted for use in bacteriological culture media, and is carefully standardized to give uniform results. It is recommended for use in the quantities specified, in all formulæ requiring Beef Extract. It has a high nitrogen content, low ash, and low chlorides, superior in these respects to other domestic brands, which are designed for food purposes rather than scientific use. This article offers the advantage of a definite, standardized, correct composition for bacteriologists.
Per 4-oz. collapsible tube, **$1.05**
1-lb. tin, **3.50**

Bacto-Veal, Dehydrated, "Difco" Standardized, in coarse powder. Fresh whole veal trimmed free from fat, with water removed. More convenient, uniform, and satisfactory than fresh meat for the preparation of veal infusion media. Used in ratio of 25 to 50 grams of powder per 1000 ml. of distilled water. **½-lb.** bottle, **$2.70**
1-lb. bottle, **5.25**

Bacto-Oxgall, Dehydrated, "Difco" Standardized, in powder form. Can be used wherever ox-bile is prescribed. It is readily soluble, makes a clear solution, completely satisfactory for the pneumococcus test. Offered primarily for the preparation of bile media for enrichment of blood cultures, and for B. coli presumptive test.
¼-lb. bottle, **$ .85**
1-lb. bottle, **3.10**

Bacto-Peptone, "Difco" Standardized, for the preparation of bacteriological culture media. Supports luxuriant growth of all organisms. Gives definite tryptophane reaction before inoculation. Indol test develops in 24 hours. For a stronger Indol test use Bacto Tryptophane Broth. For Diphtheria Toxin production and for the Methyl Red test use Proteose Peptone, "Difco." Standardized to give a definite H-ion reaction of approximately pH = 7.0 (absolute neutrality) in Dunham's Solution. Used in the preparation of Wright's "unadjusted broth" for the Phenol Coefficient determination it gives consistently uniform coefficients. Free from all carbohydrates. Completely soluble. Officially approved in "Standard Methods" 1923. (See Bulletins 20 and 25.) **1-oz.** bottle, **$ .43**
½-lb. bottle, **2.45**
1-lb. bottle, **4.85**

Proteose Peptone, "Difco" Standardized. A product of entirely different properties from other available domestic peptones. It is designed for the special requirements of pathogenic organisms difficultly cultivatable. In addition to the usual nutritive elements of true peptones and amino acids, a definite proportion of proteoses is retained. This results in unusually favorable conditions for the maintenance of virulence and the demonstration of the elaboration of by-products.

Culture Media prepared with this peptone more nearly approximate the conditions met with in the fluids of the human body during infection. Diphtheria toxin of strong uniform potency for injection of animals or for the preparation of toxin-antitoxin mixtures can be prepared easily with Proteose Peptone. The high potency of the toxin obtained results in lowering the total solids in the immunization dose with a consequent lessened local reaction. Every lot is standardized to produce 500 M.L.Ds. per ml. or better in triplicate tests.

Such biochemical processes as the elaboration of Indol take place readily. In maintaining virulence of pathogenes, such as the pneumococcus, it gives excellent satisfaction. The buffer content is very strong in the region of pH 6.0 to pH 8.0. Accordingly this product may be substituted in such formulas as the original Methyl Red Test medium of Clark, and others where a predetermined buffer content is necessary. Because of its buffer content, resulting media will be especially desirable in studies of fermentative reactions, according to the principles demonstrated by Bronfenbrenner.

Proteose Peptone can be used for any purpose that any peptone has ever served, and in addition has unique properties of its own and unusual nutritive qualities that recommend it for critical work. This product is the result of scientific analysis and scientifically controlled production. Each lot is processed under standardized conditions of hydrolysis, and built up to meet a definite tested formula. It is offered to meet primarily the special requirements of special work. It is not intended to supplant **Bacto-Peptone** which must continue to serve all ordinary requirements, but to supplement it in special fields of Bacteriology.

1-oz. bottle, **$ .60**
½-lb. bottle, **3.10**
1-lb. bottle, **6.00**

BACTERIOLOGICAL CULTURE MEDIA AND REAGENTS

Bacto-Dextrose, "Difco" Standardized, specially prepared dextrose of unusual purity, free from all other sugars, and from starch, proteid, alcohol, and heavy metals. Moisture content less than 1%. Makes an exceptionally brilliant, colorless, aqueous solution.

¼-lb. bottle, **$ .95**
½-lb. bottle, **1.90**
1-lb. bottle, **3.60**

Bacto-Lactose, "Difco" Standardized, specially prepared lactose, free from dextrose as determined by Ebert, typhi and electrometric determination of H-ion concentration, makes an exceptionally brilliant, colorless, aqueous solution.

¼-lb. bottle, **$ .60**
½-lb. bottle, **1.15**
1-lb. bottle, **2.00**

ENRICHMENT FLUID FOR CULTURE WORK

Bacto-Ascitic Fluid, "Difco" Standardized, represents a mixture of Ascitic Fluids from several individuals. It is recommended as an enrichment fluid for the cultivation of the meningococcus, gonococcus, pneumococcus, and other bacteria that are difficult to cultivate on the ordinary artificial culture media. The usual proportion for use is 10 ml. of Ascitic Fluid to 20 or 30 ml. of medium. The sterile fluid is packed under aseptic conditions in sterile ampoules, each containing 10 ml.
Per box of 12 sterile ampoules (10 ml. each)**$2.50**

SEROLOGICAL REAGENTS

Bacto-Beef Heart, Dehydrated, is recommended for use in the preparation of antigens used in tests for syphilis, particularly those used in the Kolmer Complement Fixation Test and the Kahn Precipitation Test.

25 grams, $ .75
Per ¼ lb. 2.00
Per 1 lb. 7.00

Bacto-Cholesterol is a product of the highest purity, prepared especially for the cholesterolizing of antigens used in tests for syphilis.

1 gram, $ .50
5 grams, 1.50
10 grams, 2.50
25 grams, 5.75

DEHYDRATED CULTURE MEDIA

BACTO
NUTRIENT AGAR 1%

Dehydrated

Conforms to "Standard Methods" formula

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Agar	12 parts

Adjusted to reaction between +0.5 and +1.0

Dissolve 20 grams in 1000 ml. distilled water by boiling or autoclaving. Restore loss if necessary. Sterilize in the usual manner. The resulting complete medium is ready for use.

If sterilized 20 min. at 15 lbs. pH=6.5±.

1 pound bottle (will make 22 litres of medium) . **$8.00**
¼ pound bottle **2.25**

BACTO
NUTRIENT AGAR 1½%

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Agar	15 parts
Sodium Chloride	8 parts

Adjusted to reaction=+0.5

Dissolve 31 grams in 1000 ml. of distilled water by boiling or autoclaving. The resulting medium is ready to dispense in containers for final sterilization. Blood may be added in suitable proportion for Blood Agar.

If sterilized 20 min. at 15 lbs. pH=7.0±.

1 pound bottle (will make 15 litres of medium) . **$6.25**
¼ pound bottle **1.80**

LEVINE'S
EOSINE METHYLENE BLUE AGAR

Dehydrated

Conforms to "Standard Methods" formula.

Bacto-Peptone	10 parts
Bacto-Agar	15 parts
Dipotassium Phosphate	2 parts
Bacto-Lactose	10 parts
Eosine	0.4 part
Methylene Blue	0.1 part

Dissolve 37.5 grams in 1000 ml. of distilled water by boiling or autoclaving, preferably the latter. Sterilize in the usual manner. The resulting complete culture medium is ready for use. If sterilized 20 min. at 15 lbs. pH=7.1±.

Used for differentiation of coli-aerogenes group.

1 pound bottle (will make 12 litres of medium) . . **$7.25**
¼ pound bottle **2.05**

BACTO
RUSSELL DOUBLE SUGAR AGAR

Dehydrated

Bacto-Peptone	10 parts
Bacto-Agar	15 parts
Bacto-Lactose	10 parts
Bacto-Dextrose	1 part
Sodium Chloride	5 parts
Andrade Indicator	0.025 part
Sodium Hydroxide	q.s.

Dissolve 42 grams in 1000 ml. of distilled water by boiling or autoclaving. Avoid excess heat. Tube, sterilize in the usual manner. The resulting complete culture medium, cooled in a slanting position, is ready for use. Slants are colorless when cold.

For Differentiation of Esch. coli, S. paratyphi, S. schotmuelleri, Ebert. typhi, and Ebert. dysenteriæ.

1 pound bottle (will make 10 litres of medium) **$5.00**
¼ pound bottle **1.50**

BACTO
EOSINE METHYLENE BLUE AGAR

Dehydrated

Bacto-Peptone	10 parts
Bacto-Agar	15 parts
Bacto-Lactose	5 parts
Bacto-Saccharose	5 parts
Dipotassium Phosphate	2 parts
Eosine	0.2 part
Methylene Blue	0.05 part

Dissolve 37 grams in 1000 ml. of distilled water by boiling or autoclaving. Sterilize in the usual manner. The resulting complete culture medium is ready for use.

Used in place of Endo's Medium for isolation of coli, typhosum, etc.

1 pound bottle (will make 12 litres of medium) — **$7.25**
¼ pound bottle **2.05**

BACTERIOLOGICAL CULTURE MEDIA AND REAGENTS

BACTO
KRUMWIEDE TRIPLE SUGAR AGAR

Dehydrated

Bacto-Peptone	10 parts
Bacto-Agar	15 parts
Bacto-Lactose	10 parts
Bacto-Saccharose	10 parts
Bacto-Dextrose	1 part
Sodium Chloride	5 parts
Andrade Indicator	0.025 part
Sodium Hydroxide	q.s.

Dissolve 52 grams in 1000 ml. of distilled water by boiling or autoclaving. Avoid excess heat. Tube, sterilize in the usual manner. The resulting complete culture medium, cooled in a slanting position, is ready for use. Slants are colorless when cold. Particularly useful in detecting "intermediates" of colon-typhoid group.

1 pound bottle (will make 8 litres of medium) . . **$4.75**

¼ pound bottle **1.40**

BACTO
ENDO'S AGAR

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Agar	15 parts
Bacto-Lactose	10 parts
Sodium Sulphite	q.s.
Basic Fuchsin	0.10 part

Dissolve 34 grams in 1000 ml. of distilled water, with as little heat as possible. Autoclaving is recommended. Sterilize in the usual manner. Make up only the amount to be used quickly. The resulting complete medium when set in the cold gives a faint pink medium sensitive to reaction changes.

If sterilized 20 min. at 15 lbs. pH=7.0±.

1 pound bottle (will make 13 litres of medium) . . **$8.00**

¼ pound bottle **2.25**

Owing to the instability of sulphite, this medium is not as satisfactory as Eosine Methylene Blue Agar, which we recommend in its stead.

BACTO
LACTOSE BROTH

Dehydrated

Conforms to "Standard Methods" formula.

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Lactose	5 parts

Adjusted to reaction=neutral.

Dissolve 13 grams in 1000 ml. of distilled water. Sterilize in the usual manner. The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH=7.5±.

1 pound bottle (will make 34 litres of medium) . . **$6.00**

¼ pound bottle **1.75**

BACTO
NUTRIENT BROTH

Dehydrated

Conforms to "Standard Methods" formula.

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts

Adjusted to reaction=+1.0.

Dissolve 8 grams in 1000 ml. of distilled water. Sterilize in the usual manner. The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH=6.5±.

1 pound bottle (will make 56 litres of medium) . . **$8.00**

¼ pound bottle **2.25**

BACTO
LACTOSE PEPTONE BILE

Dehydrated

Bacto-Peptone	10 parts
Bacto-Lactose	10 parts
Bacto-Oxgall	50 parts

Reaction is unadjusted.

Dissolve 70 grams in 1000 ml. of distilled water. Sterilize in the usual manner. The resulting complete culture medium is ready for use.

Used largely for the presumptive test for Esch. coli and for enrichment of samples in the search for Ebert. typhi. This medium is particularly free from the sediment found in whole fresh bile.

1 pound bottle (will make 6 litres of medium) . . **$4.75**

¼ pound bottle **1.40**

BACTO
LITMUS LACTOSE AGAR

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Agar	10 parts
Bacto-Lactose	10 parts
Azolitmin	1 part

Adjusted to reaction=neutral.

Dissolve 29 grams in 1000 ml. of distilled water by boiling or autoclaving. Restore loss if necessary. Sterilize in the usual manner. The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH=7.0±.

1 pound bottle (will make 15 litres of medium) . . **$10.00**

¼ pound bottle **2.75**

BACTO
LITMUS MILK

Dehydrated

Fresh skimmed milk colored with litmus, and with water removed.

Dissolve 105 grams in 1000 ml. of distilled water. Sterilize in the usual manner. The resulting complete culture medium is ready for use and will be of a correct neutral tint when cooled.

Used frequently in the study of organisms which cause souring of milk and dairy products.

1 pound bottle (will make 4 litres of medium) . . . **$3.20**

¼ pound bottle **1.05**

BACTO
PURPLE LACTOSE AGAR

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Agar	10 parts
Bacto-Lactose	10 parts
Dibromcresolsulphonephthalein	0.025 part

Dissolve 29 grams in 1000 ml. of distilled water by boiling or autoclaving. Restore loss if necessary. Sterilize in the usual manner. The resulting complete medium is ready for use. Acid colonies are yellow; alkali producers are purple.

If sterilized 20 min. at 15 lbs. pH=6.5±.

1 pound bottle (will make 15 litres of medium) . . **$8.00**

¼ pound bottle **2.25**

BACTERIOLOGICAL CULTURE MEDIA AND REAGENTS

BACTO-LOEFFLER'S BLOOD SERUM

Dehydrated

Beef Blood Serum	3 parts
Dextrose Broth	1 part

Solution: To **80 grams** of powder add 1000 ml. distilled water warmed to 40°–42° C., rotating the flask to get an even mixture. When in solution dispense into test tubes according to regular practice.

Coagulation: If an autoclave is used, place the tubes in a slanting position in the chamber. Do not put over 3 layers of tubes in a container. Close all ports and doors **before** turning on the steam. Run the pressure rapidly to 15 pounds and hold it there for 10 minutes. Do not use over 15 pounds.

(Place newspapers below the tubes if steam enters from below. If steam enters from above and pressure is generated slowly, place newspapers above the tubes. If pressure is attained quickly, no papers are needed.)

Sterilization: After the coagulation period open the lowest port and replace the entrapped air with steam. It is quite important to maintain constant pressure while replacing the air with steam, as any great change in pressure will cause the slants to bubble. Sterilize for 15 minutes at 15 pounds.

When sterilization is complete allow the autoclave to cool slowly. **Do not open any ports until the pressure is nil.**

If any form of sterilizer operated at atmospheric pressure is used, keep the temperature below 95° C. In using the Arnold sterilizer, leave the door ajar during coagulation and sterilization. For this reason several successive fractional sterilizations are necessary.

1 pound bottle (will make 5.5 litres—1100 or 2200 tubes of medium)	**$12.00**
¼ pound bottle	**3.25**

MEDIA FOR FERMENTATION STUDIES

BACTO
ANDRADE DEXTROSE BROTH

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Dextrose	5 parts
Andrade Indicator, Difco	0.025 part
Sodium Hydroxide	q.s.

Dissolve 13 grams in 1000 ml. of distilled water. Sterilize in the usual manner, **avoiding excess heat.** The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH = 7.7 ±.

1 pound bottle (will make 34 litres of medium)	**$9.25**
¼ pound bottle	**2.60**

BACTO
ANDRADE SACCHAROSE BROTH

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Saccharose	5 parts
Andrade Indicator, Difco	0.025 part
Sodium Hydroxide	q.s.

Dissolve 13 grams in 1000 ml. of distilled water. Sterilize in the usual manner, **avoiding excessive heat.** The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH = 7.7 ±.

1 pound bottle (will make 34 litres of medium)	**$8.50**
¼ pound bottle	**2.50**

BACTO
ANDRADE LACTOSE BROTH

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Lactose	5 parts
Andrade Indicator, Difco	0.025 part
Sodium Hydroxide	q.s.

Dissolve 13 grams in 1000 ml. of distilled water. Sterilize in the usual manner, **avoiding excessive heat.** The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH = 7.7 ±.

1 pound bottle (will make 34 litres of medium)	**$8.75**
¼ pound bottle	**2.55**

BACTO
ANDRADE MANNITE BROTH

Dehydrated

Bacto-Beef Extract	3 parts
Bacto-Peptone	5 parts
Bacto-Mannite	5 parts
Andrade Indicator, Difco	0.025 part
Sodium Hydroxide	q.s.

Dissolve 13 grams in 1000 ml. of distilled water. Sterilize in the usual manner, **avoiding excessive heat.** The resulting complete culture medium is ready for use.

If sterilized 20 min. at 15 lbs. pH = 7.7 ±.

1 pound bottle (will make 34 litres of medium)	**$12.00**
¼ pound bottle	**3.25**

BIOLOGICAL STAINS

(Dry and in Solution)

Name			Price
Alizarin (Dihydroxy Anthraquinone) Dry	25 gm.	c.b.	$1.70
Alizarin Paste, 20% Solution	4 oz.	c.b.	$ .75
	8 oz.	c.b.	1.00
Alizarin Sodium Mono Sulphonate, Dry	25 gm.	c.b.	$2.10
Alkali Blue, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50
Aniline Blue, Certified, Water Soluble, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Aniline Red, see Fuchsin			
Auramin, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50
Azolitmin (Indicator)	½ oz.	c.b.	$2.60
Azur I, Dry	gm.	c.b.	$1.25
	10 gm.	c.b.	7.00
Azur II, Dry	gm.	c.b.	$1.25
	10 gm.	c.b.	7.00
Azur II Eosin, Dry	gm.	c.b.	$1.70
	10 gm.	c.b.	9.85
Benzopurpurin, Dry	10 gm.	c.b.	$ .45
	25 gm.	c.b.	.95
Biebricht Scarlet, Dry	10 gm.	c.b.	$ .60
	25 gm.	c.b.	1.35
Bismarck Brown, Certified, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.30
Bismarck Brown, Water Solution	oz.	c.b.	$ .25
	4 oz.	c.b.	.50
Brilliant Cresyl Blue, Certified, Dry	10 gm.	c.b.	$3.40
	25 gm.	c.b.	6.00
Brilliant Green, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50
Brom Cresol Purple, Indicator (Clark and Lubs), Dry	gm.	vial	$2.20
Brom Phenol Blue, Indicator (Clark and Lubs), Dry	gm.	vial	$2.20
Brom Thymol Blue, Indicator (Clark and Lubs), Dry	gm.	vial	$2.20
Carbol Fuchsin (Ziehl-Neelson), Solution	4 oz.	c.b.	$ .75
	8 oz.	c.b.	1.00
Carmine, Pure, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50
Chrysoidin, Dry	10 gm.	c.b.	$ .50
	25 gm.	c.b.	1.00
Congo Red, Certified, Dry	10 gm.	c.b.	$ .70
	25 gm.	c.b.	1.30
Congo Red, Solution	4 oz.	c.b.	$1.00
	8 oz.	c.b.	1.30
Coralline (Rosolic Acid), Water Soluble, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.35

Name			Price
Cresol Red, Indicator, (Clark and Lubs), Dry	gm.	vial	$2.20
Cresyl Echt Violet, Certified, Dry	10 gm.	c.b.	$3.40
	25 gm.	c.b.	6.00
Crystal Violet, Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Delafield Solution, see **Haematoxylin Solution, Delafield**			
Eosin, Bluish, Dry	10 gm.	c.b.	$ .85
	25 gm.	c.b.	1.70
Eosin, Yellowish, Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Eosin-Methylene Blue, Dry	10 gm.	c.b.	$2.25
	25 gm.	c.b.	4.35
Eosin, Alcohol Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.20
Eosin, Water Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	.85
Erythrosin, Dry	10 gm.	c.b.	$1.15
	25 gm.	c.b.	2.25
Fuchsin, Acid, Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Fuchsin, Acid, Saturated Alcoholic Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.00
Fuchsin, Basic (Staining) **Certified,** Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Fuchsin, Basic (Endo Agar) **Certified,** Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Fuchsin, Basic, Saturated Alcoholic Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.20
Fuchsin, Basic, Saturated Water Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	.75
Fuchsin, Carbol, see Carbol Fuchsin			
Gabbet's Stain, see **Methylene Blue, Gabbet's Stain**			
Gentian Violet, Certified	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Gentian Violet, Carbol, Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	.75
Giemsa Stain, Romanowsky's Stain, Dry	gm.	c.b.	$1.90
	10 gm.		10.35
Haematoxylin, C.P., White Crystals, Certified	10 gm.	c.b.	$2.85
	25 gm.	c.b.	5.40
Haematoxylin, Crude, see Logwood			
Haematoxylin, Dark (Logwood Crystals)	10 gm.	c.b.	$ .50
	25 gm.	c.b.	1.00
Haematoxylin Solution, Delafield	oz.	c.b.	$ .50
	4 oz.	c.b.	1.20

Prices include containers except where otherwise noted. All prices are subject to market fluctuations.

BIOLOGICAL STAINS

(Dry and in Solution)

Name			Price
Hasting's Stain, Solution	oz.	c.b.	$ .65
	4 oz.	c.b.	1.50
Indigo Carmine, Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Iodine Solution, Gram	oz.	c.b.	$ .50
	4 oz.	c.b.	.75
Janus' Green, Certified, Dry	10 gm.	c.b.	$1.25
	25 gm.	c.b.	2.30
Jenner's Stain, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	2.85
Jenner's Stain, Solution	oz.	c.b.	$ .65
	4 oz.	c.b.	1.50
Lacmoid, Scales, C.P.	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.80
Light Green S.F. Yellowish, Certified, Dry	10 gm.	c.b.	$1.25
	25 gm.	c.b.	2.30
Litmus, Cubes	¼ lb.	c.b.	$ .90
	lb.	c.b.	2.15
Litmus, Powder	¼ lb.	c.b.	$1.00
	lb.	c.b.	2.30
Loeffler's Methylene Blue, see **Methylene Blue, Loeffler's**			
Malachite Green, Crystals	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50
Methyl Blue, Dry	10 gm.	c.b.	$ .85
	25 gm.	c.b.	1.75
Methyl Green, Certified, Dry	10 gm.	c.b.	$1.25
	25 gm.	c.b.	2.30
Methyl Orange, Certified, Dry	10 gm.	c.b.	$ .70
	25 gm.	c.b.	1.30
Methyl Orange, Indicator	100 ml.	c.b.	$ .50
	500 ml.	c.b.	1.50
Methyl Red, Dry	10 gm.	c.b.	$1.25
	25 gm.	c.b.	2.50
Methyl Red, Solution	25 ml.	c.b.	$ .40
	100 ml.	c.b.	1.00
Methyl Violet B, Dry	10 gm.	c.b.	$ .65
	25 gm.	c.b.	1.50
Methylene Blue, Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Methylene Blue, Gabbet's Stain, Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.25
Methylene Blue, Loeffler's Stain, Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.00
Methylene Blue, Polychrome, Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.00
Methylene Blue, Tablets	**Per 100 tablets**		$2.50
Methylene Blue, Wright's Stain, Solution, see **Wright's Stain**			
Methylene Green, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50

Name			Price
Naphthol Green "B", Dry	10 gm.	c.b.	$ .65
	25 gm.	c.b.	1.50
Naphthol Yellow	10 gm.	c.b.	$ .65
	25 gm.	c.b.	1.35
Neusser Stain, Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.00
Neutral Red, Certified, Dry	10 gm.	c.b.	$1.25
	25 gm.	c.b.	2.30
Nigrosine, Dry	10 gm.	c.b.	$ .50
	25 gm.	c.b.	1.00
Orange G, Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Phenol Red, see **Phenolsulphonephthalein**			
Phenolphthalein, U.S.P., Dry	oz.	c.b.	$ .50
	lb.	c.b.	2.60
Phenolphthalein, Alcohol Solution	oz.	c.b.	$ .50
	litre	c.b.	4.00
Phenolsulphonephthalein, Dry	gm.	c.b.	$1.75
Phenolsulphonephthalein, Ampoules	**Per box of 10 Ampoules**		$1.70
Primuline, Dry	10 gm.	c.b.	$ .85
	25 gm.	c.b.	1.70
Pyronin, Certified, Dry	10 gm.	c.b.	$2.30
	25 gm.	c.b.	4.30
Romanowsky's Stain, see **Giemsa Stain**			
Rosolic Acid, see **Coralline**			
Rosaniline Hydrochloride, Dry	10 gm.	c.b.	$ .75
	25 gm.	c.b.	1.50
Safranin "O", Certified, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	1.85
Safranin, Alcohol Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.25
Scarlet Red, Dry	10 gm.	c.b.	$1.00
	25 gm.	c.b.	2.10
Sudan III, Certified, Dry	10 gm.	c.b.	$1.00
	100 gm.	c.b.	5.50
Sudan IV, Certified, Dry	10 gm.	c.b.	$1.00
	100 gm.	c.b.	3.60
Thionin, Certified, Dry	10 gm.	c.b.	$2.30
	25 gm.	c.b.	4.30
Toluidine Blue "O", Certified, Dry	10 gm.	c.b.	$1.25
	25 gm.	c.b.	2.30
Toluidine Blue, Solution	oz.	c.b.	$ .50
	4 oz.	c.b.	1.00
Wright's Stain, Certified, Dry	10 gm.	c.b.	$2.30
	25 gm.	c.b.	4.30
Wright's Stain, Solution	oz.	c.b.	$ .75
	8 oz.	c.b.	3.80

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For Standard Methods of

THE AMERICAN SOCIETY FOR TESTING MATERIALS

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